UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

F/NWR5

December 3, 2004

Lawrence C. Evans, Chief
U.S. Army Corps of Engineers
Regulatory Branch, CENWP-CO-GP
PO Box 2946
Portland, OR 97208-2946

RE: Endangered Species Act Section 7 Formal Consultation and the Magnuson-Stevens Act Essential Fish Habitat Consultation for the City of Albany Fishway Modification, Diversion Dam Modification, Fish Screen Construction, and Canal Headworks Rehabilitation Project, South Santiam River, Linn County, Oregon. NOAA Fisheries Consultation No. 2004/00721.

Dear Mr. Evans:

Enclosed is a Biological Opinion prepared by the National Marine Fisheries Service (NOAA Fisheries), pursuant to Section 7 of the Endangered Species Act (ESA), for the modification of the existing City of Albany's dam and right bank fishway, construction of a new left bank fishway and fish screen at the Santiam – Albany Canal intake, and rehabilitation of the canal headworks. The City of Albany's dam and canal are located on the South Santiam River, in Marion County, approximately 18 miles east of the Albany, Oregon metropolitan area.

This Biological Opinion represents NOAA Fisheries' response to your May 26, 2004, letter and enclosed biological assessment requesting consultation. NOAA Fisheries concludes that the proposed action is not likely to jeopardize the continued existence of Upper Willamette River (UWR) chinook salmon and UWR steelhead. NOAA Fisheries has included reasonable and prudent measures, and non-discretionary terms and conditions that are necessary and appropriate to minimize the potential for incidental take associated with this project.

Enclosed as Section 11 of the Biological Opinion is a consultation regarding essential fish habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267). NOAA Fisheries finds that the proposed action may adversely affect EFH for UWR chinook salmon and UWR steelhead, and recommends that the terms and conditions of Section 8.3 of the Biological Opinion be adopted as EFH conservation measures.

As noted in the Opinion, this consultation considers solely potential effects on listed species of actions covered by the proposed Clean Water Act Section 404 permit. This consultation does not consider the effects of related actions outside the jurisdiction of the Corps, including the diversion of water and operation of facilities as authorized by the Federal Energy Regulatory Commission in its issuance of a hydroelectric license to the City of Albany on October 23, 1998.

Please direct comments or questions regarding this Opinion and MSA consultation to Stephanie Burchfield of my staff at 503-736-4720, or email Stephanie.Burchfield@noaa.gov.

Sincerely,

for D. Robert Lohn
Regional Administrator

cc: Peter Harr, City of Albany
Magalie R. Salas, FERC
Craig Massie, CH2M Hill
Stan van de Wetering, Confederated Tribes of the Siletz Indians
Clay Penhollow, Confederation Tribes of the Warm Springs Reservation
Rod Thompson, Confederated Tribes of the Grand Ronde Community of Oregon
Bob Heineth, Columbia River Inter-Tribal Fish Commission
Ken Homolka, ODFW-Salem
Steve Mamoyac, ODFW-Corvallis
Ann Gray, USFWS

Endangered Species Act
Section 7 Consultation

BIOLOGICAL OPINION

and

MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT CONSULTATION

on the Effects of Issuance of a Corps Section 404 Permit for Construction Activities (fishway modification, diversion dam modification, fish screen construction and canal headworks rehabilitation) for the City of Albany's Diversion Dam and Santiam–Albany Water Canal in the South Santiam Subbasin, on Upper Willamette River Spring Chinook Salmon and Upper Willamette River Steelhead

Action Agency:	U.S. Army Corps of Engineers
Consultation Conducted by:	National Marine Fisheries Service (NOAA Fisheries) Northwest Region
Hydropower Division	
NOAA Fisheries Log Number:	F/NWR/2004/00721
Date Issued:	December 03, 2004

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ACRONYMS AND ABBREVIATIONS

AR	at risk
BRT	West Coast Salmon Biological Review Team
canal	Santiam-Albany Water Canal
cfs	cubic feet per second
CFR	Code of Federal Regulations
City	City of Albany
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
dam	Lebanon Dam
DQA	Data Quality Act
DEQ	Oregon Department of Environmental Quality
DO	dissolved oxygen
EFH	essential fish habitat
ESA	Endangered Species Act
ESCP	Erosion and Sediment Control Plan
ESU	evolutionarily significant unit
FEA	final environmental assessment
FERC	Federal Energy Regulatory Commission
FR	Federal Register
ft	foot, feet
HUC	Hydrologic Unit Code
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NOAA Fisheries	National Marine Fisheries Service
NPF	not properly functioning
NR	not reduce, retard, or impair
ODFW	Oregon Department of Fish and Wildlife
Opinion	Biological Opinion for Construction Activities at Lebanon Dam and Santiam – Albany Water Canal Intake
PCP	pollution control plan
PFC	properly functioning condition
PFMC	Pacific Fisheries Management Council
PNERC	Pacific Northwest Ecosystem Research Consortium
RM	river mile
RPA	reasonable and prudent alternative
RPM	reasonable and prudent measure
SSWC	South Santiam Watershed Council
SLOPES II	Standard Local Operating Procedures for Endangered Species (NOAA 2003a)

ACRONYMS AND ABBREVIATIONS, CONTINUED

TMDL	total maximum daily load
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
UWR	Upper Willamette River
VSP	viable salmonid population
W/LC TRT	Willamette/Lower Columbia Technical Recovery Team

1. INTRODUCTION

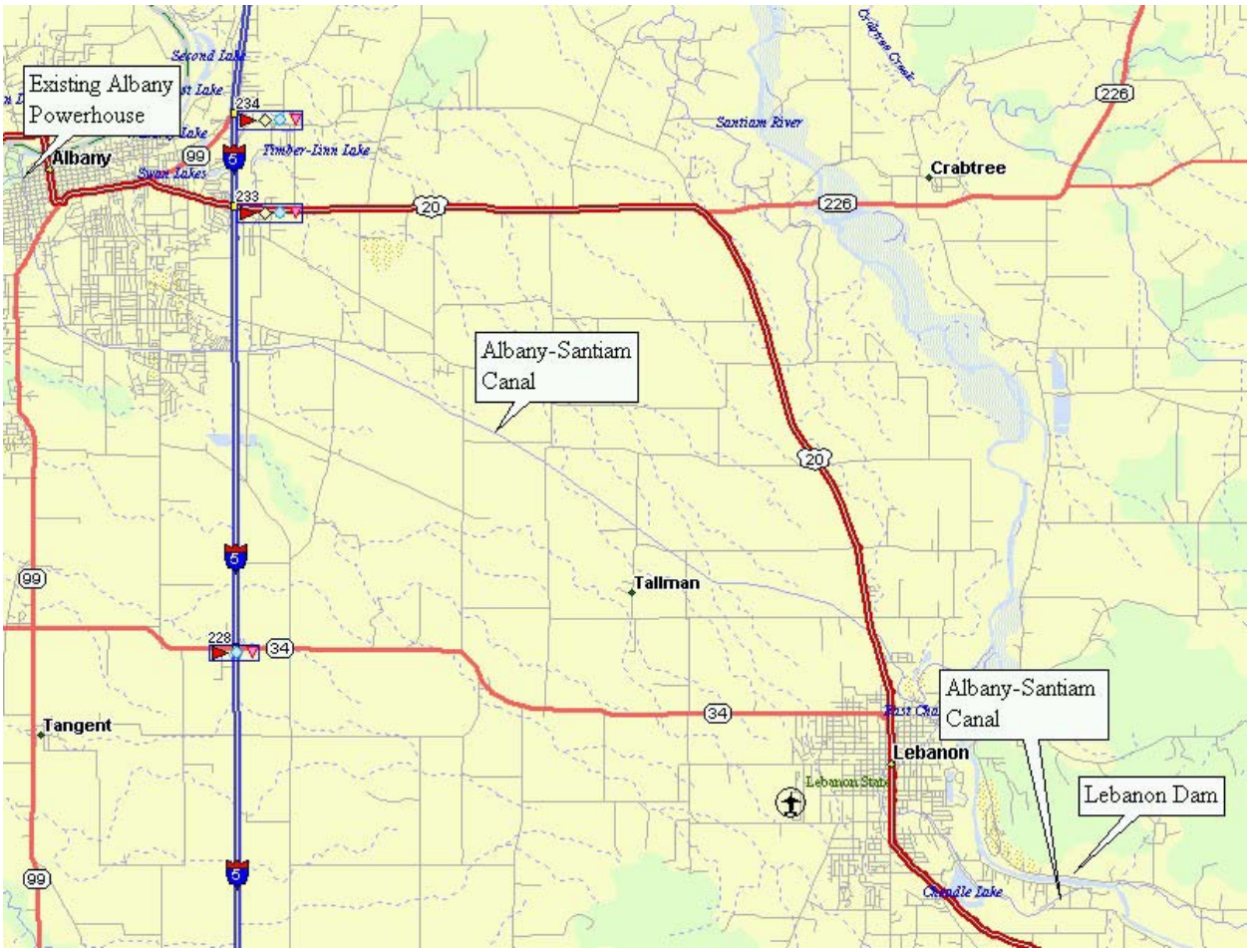
Section 404 of the Clean Water Act (CWA) requires an individual to obtain authorization from the U.S. Army Corps of Engineers (Corps) for the discharge or removal of fill into all waters of the United States, including wetlands. Section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (ESA) requires Federal agencies, including the Corps, to consult with the National Marine Fisheries Service (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS), as appropriate, to ensure that any action they authorize, fund, or carry out is not likely to reduce appreciably the likelihood of both the survival and recovery of species listed as endangered or threatened or to destroy or adversely modify their designated critical habitat.

This is NOAA Fisheries' biological opinion (Opinion) on the Corps' proposed issuance of a Section 404 permit for the City of Albany's (City) construction activities at the Lebanon Dam (dam) and Santiam-Albany Water Canal (canal) in the South Santiam River subbasin, as described in section 2. The term of this Opinion is equal to the duration of permit coverage. The City's construction activities at the dam and canal are expected to begin in January 2005 and continue through December 2006. This Opinion will be effective through the completion of all construction activities covered by the issued 404 permit.

1.1 Background and Consultation History

The City owns and operates Lebanon Dam, located on the South Santiam River at River Mile (RM) 20.3, in Linn County, Oregon, approximately 18 miles east of Albany. The existing diversion dam, constructed in 1925, is six feet (ft) high and approximately 450 ft long. The City diverts water at the dam and into the canal, originally constructed in 1870. The 18 mile-long canal provides municipal water for the cities of Albany and Lebanon. The canal also supplies water for irrigators and other users. At the end of the canal, the City runs remaining water through a 500 kilowatt turbine generator before releasing it into the Calapooia River at RM 0.25. Figure 1-1 identifies the general location of the City's dam, canal and powerhouse.

Figure 1-1 Location of City of Albany project features.



The Federal Energy Regulatory Commission (FERC) regulates licensing of the City's hydroelectric facilities. On October 23, 1998, FERC issued an original license to the City that requires the City to replace the inadequate left bank fish ladder and to modify the right bank fish ladder at the dam; to modify the diversion dam; and to construct fish screens and rehabilitate headworks at the canal (FERC 1998a). FERC has not consulted with NOAA Fisheries under Section 7(a)(2) of the ESA regarding the effect of this action on ESA-listed salmon and steelhead. However, the proposed construction at the City's dam and canal prompted the need for a Section 404 permit from the Corps. The City submitted an application for a Section 404 permit on March 15, 2004, for its proposed construction activities (City of Albany 2004a).

By letter, dated May 26, 2004, the Corps requested initiation of formal consultation with NOAA Fisheries on the subject permit application (Corps 2004). The Corps enclosed a Biological Assessment, entitled, "Santiam-Albany Canal and Diversion Dam Project, Albany, Oregon, February 2004" (CH2M HILL 2004a) with its request for formal consultation. NOAA Fisheries accepted the Corps' request to initiate consultation by letter, dated July 1, 2004 (NOAA Fisheries 2004a). In that letter, NOAA Fisheries noted that it would also use additional information that was provided by the City since the February 2004 Biological Assessment was completed, to conduct its analysis. Since August, 2003, the City has engaged NOAA Fisheries and other Federal and State agencies in technical meetings to review the construction designs and facilities' plans.

On July 8, 2003, NOAA Fisheries issued a programmatic biological opinion entitled, "Programmatic Biological Opinion and Magnuson-Stevens Act Essential Fish Habitat consultation for Standard Local Operating Procedures for Endangered Species (SLOPES II) for certain regulatory and operations activities carried out by the Department of Army permits in Oregon and the north shore of the Columbia River" (NOAA Fisheries 2003a). In the SLOPES II, NOAA Fisheries outlined 13 reasonable and prudent measures (RPMs) for specific categories of construction activities which frequently require permits from the Corps, as well as specific terms and conditions for each measure. Most of the proposed construction at the dam and canal corresponds to one or more categories covered by SLOPES II. The City incorporated applicable RPMs from SLOPES II in its application for a Section 404 permit.

In response to a court decision, NOAA Fisheries has proposed to revise its hatchery listing policy, as noticed in the *Federal Register* on June 3, 2004 (69 FR 31354). This rule, if finalized, would revise the listing status of 25 currently listed Pacific salmonid ESUs and to list two additional ESUs (including Oregon Coast coho) on June 14, 2004 (69 FR 33102). These proposals include listing of over 100 hatchery populations of salmon and steelhead and the listing of some resident rainbow trout. The comment period has closed, and NOAA Fisheries expects to make final decisions on the proposed listing rule by June 14, 2005. However, NOAA Fisheries expects to adopt a final hatchery listing policy several months before issuing the final listing revisions rule. NOAA Fisheries will use that final policy in making its final listing decisions.

NOAA Fisheries is also in the process of completing new critical habitat designations. NOAA Fisheries anticipates publishing a proposed rule designating critical habitat in the near future. Although no critical habitat is currently designated for Upper Willamette River (UWR) chinook salmon (*Oncorhynchus tshawytscha*) and Upper Willamette River (UWR) steelhead (*Oncorhynchus mykiss*), habitat within the action area of this Opinion is currently under consideration for designation. Should this area be designated as critical habitat for either of these ESUs through a final rule, reinitiation of formal consultation (section 10) is required to determine if the proposed action is likely to destroy or adversely affect the designated critical habitat. NOAA Fisheries' analysis in this Opinion is likely to be relevant for the consideration of the proposed action's effects on critical habitat should it be designated during the term of the proposed action.

1.2 Application of ESA Section 7(a)(2) Standards-Analytical Approach

This section reviews the approach used in this Opinion in order to apply the standards for determining jeopardy and destruction or adverse modification of critical habitat as set forth in Section 7(a)(2) of the ESA and as defined by 50 Code of Federal Regulations (CFR) §402.02 (the consultation regulations). Additional guidance for this analysis is provided by the Endangered Species Consultation Handbook, March 1998, issued jointly by NOAA Fisheries and USFWS (USFWS and NOAA Fisheries 1998). In conducting analyses of actions under Section 7 of the ESA, NOAA Fisheries takes the following steps, as directed by the consultation regulations:

- Evaluates the current status of the species at the ESU level with respect to biological requirements indicative of survival and recovery and the essential features of any designated critical habitat (Opinion, section 3).

- Evaluates the relevance of the environmental baseline in the action area to biological requirements and the species' current status as well as the status of any designated critical habitat (Opinion, section 4).

- Determines whether the proposed action reduces the abundance, productivity, or distribution of the species or alters any physical or biological features of designated critical habitat (Opinion, section 5).

- Determines and evaluates any cumulative effects within the action area (Opinion, section 6).

- Evaluates whether the effects of the proposed action as described in section 2, taken together with any cumulative effects and added to the environmental baseline, can be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of the affected species, or is likely to destroy or adversely affect their designated critical habitat (Opinion, section 7). (See CFR §402.14(g).)

In completing the last step, if NOAA Fisheries determines that the action under consultation is likely to jeopardize the ESA-listed species or adversely modify critical habitat[1], it must identify a reasonable and prudent alternative (RPA) for the action that avoids jeopardy or adverse modification of critical habitat and meets the other regulatory requirements for an RPA. (See CFR §402.02.) In making these determinations, NOAA Fisheries must rely on the best available scientific and commercial data.

1.3 Federal Trust Responsibility to Native Americans

Federal agencies, including NOAA Fisheries, have a legal obligation to support all Federally recognized tribes in their efforts to preserve and rebuild treaty salmon fisheries in their usual and accustomed areas. Secretarial Order No. 3206, dated June 5, 1997, directs the Department of Commerce and the Department of the Interior to carry out their respective responsibilities under the ESA in a manner that harmonizes the Federal trust responsibility with tribes, tribal sovereignty, and the statutory missions of each department, so as to avoid or minimize the potential for conflict and confrontation. Executive Order No. 13084 requires each Federal agency to establish meaningful consultation and collaboration with Indian tribal governments in formulating policies that significantly or uniquely affect their communities. Executive Order No. 13175 further elaborates that all Federal Executive departments and agencies must consult with Indian tribes and respect tribal sovereignty as they develop policy on issues that impact Native American communities.

By letters to tribal council leaders dated August 23, 2004, NOAA Fisheries notified the following tribes and tribal groups of its ESA consultation regarding the City's construction activities: Confederated Tribes of Siletz Indians, Confederated Tribes of the Warm Springs Reservation, Confederated Tribes of the Grand Ronde Community of Oregon, and Columbia River Inter-Tribal Fish Commission. Copies of these letters were also sent to designated contact personnel in their respective tribe's natural resources or fisheries programs. The letters summarized the purpose of this consultation and solicited information, traditional knowledge or comments the tribes might provide to help in the consultation. Subsequently, NOAA Fisheries staff contacted designated personnel at each tribe to discuss the proposed action and to seek the tribe's perspective on potential effects of the proposed action on the tribe's resources and rights.

None of the contacted tribes provided written responses to NOAA Fisheries' August 23, 2004 letter. In personal communications, however, tribal fisheries' personnel from all of the four tribes and tribal groups expressed an interest in securing improved upstream and downstream fish passage at the dam and canal, while minimizing construction-related resource impacts. Tribal fisheries' personnel explained that improved passage for listed species at the dam and canal would aid recovery efforts in the Willamette River Basin. They also indicated a keen

[1]As noted above in Section 1.1, NOAA Fisheries is in the process of completing new critical habitat designations. Should the action area be designated as critical habitat for listed ESUs considered in this Opinion, reinitiation of formal consultation (Section 10) is required to determine if the proposed action is likely to destroy or adversely affect the designated critical habitat.

interest in assuring effective upstream and downstream passage for Pacific lamprey (*Lampetra tridentata)*, a species that has been petitioned for listing and is currently being reviewed in a 90-day finding by USFWS.

2. PROPOSED ACTION

The Corps proposes to issue permit #200300796 under Section 404 of the CWA to the City, authorizing a series of construction activities to upgrade the City's dam and canal. The upgrades will incorporate fish passage improvements, installation of a fish screen at the entrance of the canal, and other improvements to the diversion dam as described in further detail below. This Opinion reviews all of the construction activities that the proposed permit would authorize.

The following sections contain a brief description of the existing facilities and more detailed descriptions of the specific construction activities at the dam and diversion intake to be covered under the proposed permit.

2.1 Existing City of Albany Facilities

The City's existing facilities on the South Santiam River are briefly summarized below. The City owns and maintains a diversion canal that diverts water from the South Santiam River to multiple users along the canal, a dam on the South Santiam River, and a powerhouse at the end of the canal. These existing features are depicted in Figure 1-1 and described below.

2.1.1 Santiam-Albany Water Supply Canal

The City owns and operates a historically registered 18 mile-long canal, originally constructed in 1870. This canal, known as the Santiam-Albany Water Supply Canal, diverts water from the South Santiam River, just upstream of the City of Lebanon at RM 20.8. The canal has been the primary source of drinking water for Lebanon and Albany and also provides water to various agricultural and industrial users. Currently, the entrance to the canal is unscreened, allowing fish to be diverted from the South Santiam River.

2.1.2 Lebanon Dam

The City's concrete gravity diversion dam was constructed across the South Santiam River in 1925 to ensure sufficient diversion of river water into the canal. The diversion dam is six ft high and approximately 450 ft long. It is located about 300 ft downstream of the canal intake and creates a pool near the canal entrance. The diversion dam is particularly important during low river flows, ensuring that all appropriated municipal, industrial, and agricultural water uses are met along the length of the canal.

The center fishway was constructed with the original dam in 1925. Three more fishways were added over the years, one on either side of the river and a third near the center of the river. The last fishway was completed in 1972. While all of these additions were intended to aid upstream fish migration, these modifications have had varying degrees of effectiveness. In light of the advances that have been made during the past twenty years in the science of fish ladder design, the present fishways are recognized to perform marginally, at best.

In addition to the existing fish ladders, the diversion dam includes a system of wooden flashboards installed across the top of the dam. These boards raise the river water surface elevation behind the dam by an additional two to three ft during critical low summertime river flows, in order for the City to divert sufficient water into the canal to meet authorized water rights. However, portions of these flashboards fail or are blown out during annual high winter flows. This interferes with fish passage because the missing boards create concentrated chutes of attraction water that confuse migrating fish searching for a route over the dam.

2.1.3 Powerhouse and Hydropower Generation

The City owns and maintains an historic hydropower generation facility located at the end of the 18 mile-long canal at the City's water treatment plant. Constructed in 1924, the powerhouse includes two low-head hydraulic turbine generators. The tailrace discharges into the Calapooia River at the powerhouse.

The City acquired this hydroelectric system from Pacific Power & Light in 1984, and operated it according to State laws governing hydropower generation. In 1991, FERC determined that a federal license was required for continued operation. No hydroelectric power has been generated at the facility since February 1991.

In 1994, the City applied for a hydroelectric power license from FERC. As part of the FERC license application and as the result of pre-licensing coordination with NOAA Fisheries, USFWS, and Oregon Department of Fish and Wildlife (ODFW), it was determined that modifications to the diversion dam and canal intake would be required to improve fish passage. Preliminary designs for a fish screen to prevent juvenile and adult fish from entrainment into the canal and modifications to the dam and its fish ladders were completed as part of the 1994 license application.

FERC issued the City a 50-year hydroelectric power license in October 1998 (FERC 1998a). This license requires fish passage improvements at the diversion dam and installation of a fish screen at the entrance of the canal. The license also requires that a plan be prepared, in consultation with NOAA Fisheries, USFWS, and ODFW, for conducting a post-construction hydraulic and biological evaluation of the new fish passage facilities.

The FERC license required that construction of the hydropower facility and related improvements be underway within two-years of license issuance. These improvements, including diversion dam, fish ladder modifications and fish screen installation, were to be completed and operational by October 2002. However, the City was unable to begin design or construction activities within this time frame. The City requested and obtained from FERC, with Congressional support, a time extension in December, 2002, and the opportunity to request up to two more extensions. With this extension, the current license requirements call for construction of these facilities to be underway no later than October 23, 2004. In April, 2004, the City sought a subsequent extension. FERC noticed this request for extension on June 18, 2004. NOAA Fisheries submitted a Motion to Intervene and Comments on the extension request to FERC on

July 21, 2004 (NOAA Fisheries 2004b). FERC issued an order, dated November 12, 2004, which extends the deadlines for commencing construction to October 23, 2006, and for completing construction to October 23, 2008.

2.1.4 Dam and Canal Operations

The City diverts up to 120 cubic feet per second (cfs) into the canal from the South Santiam River for municipal, industrial, and agricultural water uses. Prior to 1991, the City diverted up to 220 cfs for power and non-power purposes, however, the City has not produced hydropower since 1991 (FERC 1998b). Agricultural water uses are restricted seasonally, and the other uses remain relatively constant year round. As noted above in section 2.1.2, the City installs wooden flashboards across the top of the dam during low flow periods to divert sufficient flow into the canal to meet authorized water rights. River flows are partially controlled upstream by Corps facilities.

2.2 Proposed Action

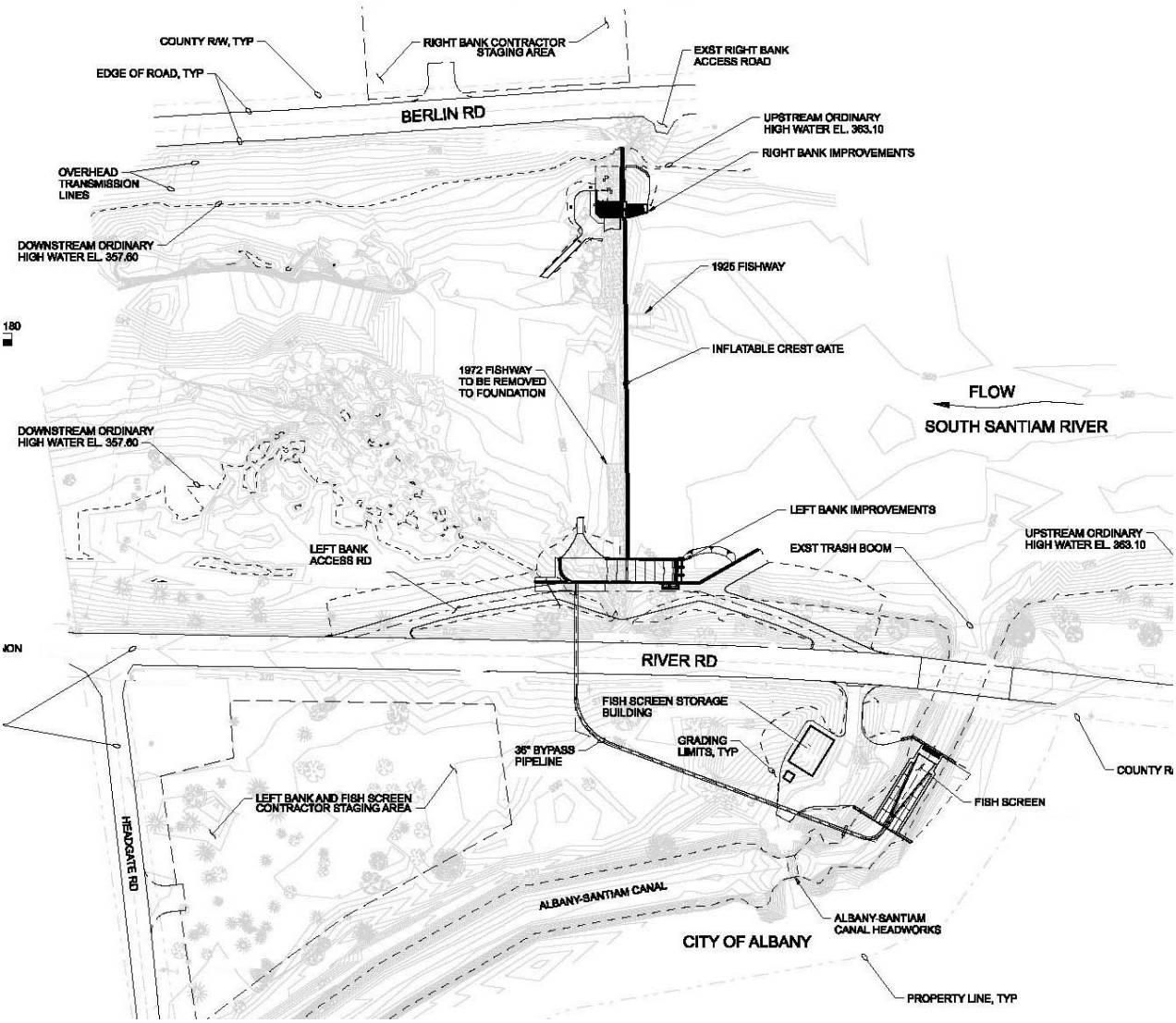
The proposed action in this Opinion is the issuance of a Corps 404 permit for dredge and fill activities as described in the City's 404 permit application, filed on March 15, 2004, for construction activities at the dam and canal intake (City of Albany 2004a). The Corps' 404 permit would also include a requirement that the City follow "Conservation and Mitigation Measures" proposed in its 404 permit application. These measures are considered part of the proposed action and are summarized in section 2.3.

Under the proposed action, the Corps would ensure that the City:

1. Modify the right bank fishway at the dam.
2. Replace the left bank fishway at the dam.
3. Close and partially remove the two center fishways at the dam.
4. Install a crest gate at the dam to eliminate the need for flashboards.
5. Install a fish screen and bypass facilities at the canal intake.
6. Replace and automate the canal head gates.

The following sections describe elements of the proposed action in further detail. Figure 2-1 is a site plan of the dam and canal intake area, depicting existing and proposed features.

Figure 2-1 Site plan of Lebanon Dam and Santiam – Albany Water Canal intake area, including proposed construction features



2.2.1 Right Bank Fishway Modifications

The existing right bank fishway at the dam is a pool and weir concrete structure. The City would improve the right bank fishway by adding two new steps and the capability to release additional attraction water at the entrance of the fishway.

2.2.2 Left Bank Fishway Reconstruction

The left bank fishway at the dam is a pool and weir concrete structure. As part of the proposed action, the City would remove the existing fishway and replace it with a high-volume, multiple-step pool and chute ladder.

2.2.3 Center Fishways Closure

The two center fishways at the dam consist of a series of pools with large drops. As part of the proposed action, the City would close and demolish the older center fishway. The City would remove the walls of the other center fishway, which was built in 1972, while the concrete base slab would remain in place.

2.2.4 Lebanon Dam Rehabilitation and Crest Gate Installation

As previously noted, the dam increases the depth of the river to enable diversion of water into the canal. The dam consists of a 6 ft high concrete section. On top of the concrete section are slots for adding another 2 to 3 ft of wooden flashboards. The City installs flashboards when streamflow recedes in late June to ensure adequate hydraulic head for providing water to authorized users along the canal. During winter storms, some of the flashboards are dislodged, and the water chutes that are created by gaps at the dam's crest falsely attract fish to impassable sections of the dam.

As part of the proposed action, the City would replace portions of the downstream apron and dam structure that have eroded over years of operation. This work is intended to restore the dam to its original configuration and structural integrity. The City would also smooth the crest of the dam to a uniform height and remove the flashboard slots. The City would then install an air-actuated steel plate and rubber crest gate, which would raise the dam crest 28 inches above the fixed dam height at the lowest flow times of the year. During high river flows, the gate would be down and the crest would sit at the same elevation as the original dam fixed crest elevation. This addition would ensure uniformity of flow across the entire diversion dam and would reduce false attraction of migrating fish. It would also enable an operator to adjust the upstream pool elevation as needed to divert authorized flows at the canal intake. The overall design has been developed through informal coordination with NOAA Fisheries, USFWS, and ODFW.

2.2.5 Canal Fish Screen

As part of the proposed action, the City would construct a fish screen in the canal near the South Santiam River at RM 20.8. In addition, a fish screen storage building with a telemetry pole would be located adjacent to the fish screen facility. Presently, no structure or device exists to prevent entrainment of juvenile and adult fish, including Federally listed UWR chinook salmon and UWR steelhead, into the 18 mile-long canal and passage through the hydroelectric turbines at the end of the canal or into other diversions along the canal.

The screen would be located in the canal upstream of the existing canal headworks and would be a vee-configuration using stainless wedge wire and an automatic screen cleaning system. A bypass pipe would return screened fish to the South Santiam River downstream of the diversion dam. The maximum design flow of the screens would be 220 cfs. The overall design has been coordinated through preliminary consultation with NOAA Fisheries, USFWS, and ODFW.

2.2.6 Canal Headworks

Currently, flow entering the canal is controlled by an existing headworks structure located about 400 ft downstream of the canal mouth on the South Santiam River. Constructed in 1924, the headworks consist of four parallel sluice gates, each 4-ft wide by 4-ft high. In addition to regulating the flow in the canal, the structure protects the canal from flooding during high river flows.

As part of the proposed action, the City would replace the headworks gates with automated steel gates to allow automatic flow diversion in compliance with permitted diversion rates. Eroded concrete at the gate seats would be repaired and other concrete repairs would be performed during the installation of gate guides and actuator stands.

2.3 Conservation and Mitigation Measures

The City included numerous conservation and mitigation measures as part of its proposed action in its section 404 application. These measures are derived from the terms and conditions in SLOPES II (NOAA Fisheries 2003a). SLOPES II identifies conditions and best management practices that will be implemented during construction to minimize or alleviate instream turbidity, sedimentation, riparian impacts, and instream habitat impacts. The Corps has adopted these proposed measures and intends to include them in the final 404 permit (Corps 2004). Specific mitigation measures to alleviate riparian impacts include the following:

a. Minimize riparian and bank disturbance to the extent possible. Construct a temporary cofferdam to provide a work platform in the river for the diversion dam and canal construction activities to minimize disturbance of riparian areas, and to minimize bank erosion and potential turbidity associated with construction activities.

b. Revegetate the streambank in the disturbed construction area immediately following construction. Use native perennials and grasses for revegetation.

c. Minimize alteration or disturbance of the streambank and existing riparian vegetation. Protect streambanks with stabilizing materials where bank work is necessary to maintain the normal waterway configuration.

d. Revegetate all disturbed areas with native plant materials, both along the bank above ordinary high water in the riprap/soil mixture and along the other creek bank areas.

e. Treat all discharge water from excavated bank and river bed material to reduce the probability of suspended solids directly entering the river. One or more of the following techniques will be used: detention pond, vegetated swale, bio-filtration bags, sediment fence, or straw bales.

f. Maintain adult and juvenile fish passage conditions for the duration of construction activities. The stream channel will not be blocked entirely. In the unlikely event that listed fish became stranded in the work area, they will be rescued and moved with the approval of the City's construction manager and under the supervision of an ODFW biologist or his/her designee.

In addition to the measures listed above, the Corps proposes to require the City to follow specific measures designated in SLOPES II (NOAA Fisheries 2003a), including the Corps' RPM #2, "General Conditions for Construction, Operation, and Maintenance," #4, "Streambank Protection," and #13, "Monitoring," during and after construction. The following sections detail the terms and conditions of each applicable Corps' RPM.

2.3.1 Construction

The Corps proposes that the City would comply with the Corps' RPM #2, "General Conditions for Construction, Operation, and Maintenance" (NOAA Fisheries 2003a). This list includes the measures the contractor would be required to follow to ensure compliance with the SLOPES II Terms and Conditions.

2.3.1.1 Timing of In-Water Work

In-water work will be completed during the ODFW in-water work period (June 1 – August 31) (ODFW 2000).

2.3.1.2 Cessation of Work

Construction activities will cease under high flow conditions that may result in inundation of the construction area, except for efforts to avoid or minimize resource damage.

2.3.1.3 Fish Passage

Adult and juvenile fish passage conditions will be maintained for the duration of the construction activities. If an activity is in question, the contractor will consult with the City's construction manager before initiating the proposed activity.

2.3.1.4 Erosion and Pollution Control Plans

The contractor will submit an Erosion and Sedimentation Control Plan (ESCP) in accordance with the Draft ESCP prepared by the City (City of Albany 2004b). This contractor-prepared plan will be specific to the construction techniques to be employed and will be submitted and approved by the City's construction manager prior to commencement of the work. The ESCP outlines how and to what specifications various erosion control devices will be installed and maintained to meet water quality standards, and will provide a specific inspection protocol and time response. The contractor may revise the ESCP with the concurrence of the City's construction manager, providing that the revised ESCP offers the same or superior protection.

a. Erosion control measures will be in-place at all times during construction. Construction within the 25-year floodplain will not begin until all temporary erosion controls are in-place. Erosion control structures will be maintained throughout the construction work period.

b. All erosion control structures will be inspected daily during construction to ensure that they are working adequately. Work crews will be mobilized to make immediate repairs to the erosion controls, or to install erosion controls during working and off-hours. Should a control measure not function effectively, the control measure will be repaired or replaced immediately. Additional controls will be installed as necessary, with the goal of minimizing turbidity and sedimentation.

c. Other erosion control measures may be required depending on changes in anticipated stream flow conditions or failure of proposed measures.

d. A pollution control plan (PCP) will be developed to prevent point-source pollution related to contractor operations. This plan will satisfy all pertinent requirements of Federal, State, and local laws and regulations, and the requirements of these special provisions. All efforts will be made to establish erosion control measures sufficient to prevent the discharge of significant amounts of sediment to surface waters and ensure that turbidity does not exceed 10 % above ambient (background) conditions.

e. Material removed during excavation will be placed only in locations where it cannot enter water bodies or wetlands. Conservation of topsoil (removal, storage, and reuse) will be employed where feasible.

Measures will be taken to prevent construction debris from falling into the river. Any material that falls into the river during construction operations will be removed in a manner that has a minimum impact on the streambed and water quality.

2.3.1.5 Preconstruction Activity

Before any construction/restoration activities, the City will ensure that the following actions will be completed:

a. The boundaries of clearing limits associated with site access and construction to prevent ground disturbance of critical riparian vegetation, wetlands, and other sensitive sites will be flagged.

b. The following emergency erosion control materials will be maintained onsite:
   i. A supply of sediment control materials (e.g., silt fence, straw bales)
   ii. Hazardous material containment booms and spill containment booms to facilitate the cleanup of hazardous material spills

c. All temporary erosion controls must be in place and appropriately installed downslope of construction activities within the riparian area until site restoration is complete.

2.3.1.6 Temporary Access Roads

a. Existing roadways or travel paths will be used whenever possible, unless construction of a new way would result in less habitat take.

b. No temporary roads will be built mid-slope or on slopes steeper than 30 %.

c. If it is necessary to build a temporary road within 150 ft of a stream, water body, or wetland, soil disturbance and compaction will be minimized by clearing vegetation to ground level and placing clean gravel over geotextile fabric, unless otherwise approved in writing by NOAA Fisheries.

d. When the construction activities are complete, all temporary access roads will be obliterated, the soil will be stabilized, and the site will be revegetated. Temporary roads in wet or flooded areas will be abandoned and restored as necessary by the end of the in-water work period.

2.3.1.7 Heavy Equipment

Vehicles will be fueled, operated, maintained, and stored as follows:

a. Staging, cleaning, maintenance, refueling and fuel storage will take place in a vehicle staging area placed 150 ft or more from any stream, water body, or wetland.

b. All vehicles operating within 150 ft of any stream, water body, or wetland will be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected will be repaired in the vehicle staging area before the vehicle resumes operation. Inspections will be documented in a record that is available for review on request by the Corps or NOAA Fisheries.

c. All equipment operated instream will be cleaned before beginning operations below the bankfull elevation to remove all external oil, grease, dirt, and mud.

d. All stationary power equipment (e.g., cranes, generators) that will be operated within 150 ft of any stream, water body, or wetland will be diapered to prevent leaks, unless otherwise approved in writing by NOAA Fisheries.

2.3.1.8 Site Preparation

a. Native materials will be conserved for site restoration.

b. If possible, native materials will be left where they are found.

c. Materials that are moved, damaged, or destroyed will be replaced with the functional equivalent during site restoration.

d. Any large wood, native vegetation, weed-free topsoil, and native channel material displaced by construction will be stockpiled for use during site restoration.

2.3.1.9 Isolation of In-Water Work Area

The work area will be isolated from the active flowing stream using inflatable bags, sandbags, sheet pilings, or similar materials.

2.3.1.10 Capture and Release

Fish that are trapped in an isolated work area will be captured and released using trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury.

a. A fishery biologist experienced with work area isolation and competent to ensure the safe handling of all ESA-listed fish will conduct or supervise the entire capture-and-release operation.

b. If electrofishing equipment is used, the capture team will comply with NOAA Fisheries' electrofishing guidelines (NOAA Fisheries 1998).

c. The capture team will handle the ESA-listed fish with extreme care, keeping fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.

d. Captured fish will be released as near as possible to the capture sites.

e. ESA-listed fish will not be transferred to anyone except NOAA Fisheries personnel, unless otherwise approved in writing by NOAA Fisheries.

f. Other Federal, State, and local permits necessary to conduct the capture-and-release activity will be obtained.

g. NOAA Fisheries, or its designated representative, will be allowed to accompany the capture team during the capture-and-release activity and will be allowed to inspect the team's capture-and-release records and facilities.

2.3.1.11 Earthwork

Earthwork will be completed as quickly as possible.

a. Disturbed areas will be stabilized within 12 hours of any break in work between September 1 and May 31. During the in-water construction period, disturbed areas will not be stabilized if work in those areas will resume within 7 days of disturbance.

b. Boulders, rock, woody materials, and other natural construction materials used for the construction activities will be obtained outside of the riparian area.

2.3.1.12 Site Restoration

a. Areas requiring revegetation will be replanted before the first April 15 following construction with a diverse assemblage of species that are native to the action area or region, including grasses, forbs, shrubs, and trees.

b. Fencing will be installed to prevent access to revegetated sites by livestock or unauthorized persons.

c. No fertilizer or pesticides will be used with the riparian plantings or within 50 ft of any wetland, waterway, or the restricted work area.

d. Damaged streambanks will be restored to a natural slope, pattern, and profile suitable for establishment of permanent woody vegetation.

2.3.2 Streambank Protection

The Corps proposes to require the City to comply with Corps' RPM #4, "Streambank Protection," of SLOPES II (NOAA Fisheries 2003a). RPM #4 provides standards and conditions for activities involving placement of material along or beside streambanks to prevent erosion, either by lining the bank with a hard surface, by altering the face of the bank using bioengineering methods, or by creating structures in the water to divert the current or to reduce the effects of wave action. These activities include the following:

a. All actions intended for streambank protection will be designed to provide the greatest degree of natural stream and floodplain function achievable through the application of an ecological approach to bank and channel protection.

b. Large wood will be included as an integral component of all streambank protection treatments. The use of rock, stone, and similar materials will be avoided. No materials listed in the "Exclusions" section of SLOPES II will be used.

2.3.3 Monitoring

The Corps proposes to require the City to comply with Corps' RPM #13, "Monitoring." RPM #13 ensures completion of a comprehensive monitoring and reporting program to confirm that the construction activities meet the objective of minimizing take from permitted activities. The following measures will be implemented in accordance with Corps' RPM #13, and the Terms and Conditions of SLOPES II.

2.3.3.1 Implementation Monitoring

The City will submit a monitoring report to the Corps within 120 days of completion of construction activities describing the City's success meeting the permit conditions. Each monitoring report will include the following information:

a. Project Identification

   i. Permittee name, permit number, and project name

   ii. Category of activity

   iii. Project location including any compensatory mitigation site(s), by 5th field Hydrologic Unit Code (HUC) and by latitude and longitude as determined from the appropriate U.S. Geological Survey (USGS) 7-minute quadrangle map

   iv. Corps contact person

   v. Starting and ending dates for work completed

b. Narrative Assessment: A narrative assessment of the project's effects on natural stream function.

c. Photo Documentation: Photos of habitat conditions at the project and compensation site(s) before, during, and after project completion.

   i. Include general views and close-ups showing details of the project and project area, including pre- and post-construction.

   ii. Label each photo with date, time, project name, photographer's name, and a comment about the subject.

d. Other Data: Additional project-specific data, as appropriate for the proposed project.

2.3.3.2 Annual Monitoring Report

The City will submit to the Corps an annual monitoring report by December 31 of each year, beginning the first year of construction, and continuing for a period of five-years following construction. The report will summarize monitoring information by activity and by 5th field HUC, with special attention to site restoration, streambank protection, and compensatory mitigation. The report also will provide an overall assessment of program activity and cumulative effects.

2.3.4 Other Conservation Measures

In addition to conservation and mitigation measures described above that are based on the Corps' RPMs #2, #4 and #13 listed in SLOPES II, the Corps proposes to require the City to comply with specific measures related to stormwater control, hazardous materials, and a biological evaluation plan. These measures are described in this section.

2.3.4.1 Stormwater Control

Stormwater runoff and seepage collected inside cofferdams will be treated and discharged to the South Santiam River and canal during construction activities. Methods for treating stormwater runoff and seepage will be followed according to the ESCP as well as the PCP, which will be developed by the contractor and submitted to Oregon Department of Environmental Quality (DEQ) for review and approval prior to the contractor commencing work activities. The plans will identify pollution and erosion control measures to be taken specific to the work activities planned. Runoff and seepage will be directed toward a sedimentation pond where suspended solids will be allowed to settle and water will be decanted and discharged to the river and/or the canal. Discharge will comply with conditions stipulated in construction permits.

2.3.4.2 Hazardous Materials

The following measures will be implemented for hazardous materials management:

a. No pollutants of any kind (petroleum products, fresh concrete, silt, welding slag, sandblasting abrasive, etc.) will come in contact with the area below the two-year flood elevation, except when working in dewatered areas.

b. No fertilizer will be used within 50 ft of the stream.

c. Vehicles will be examined daily for fluid leaks during periods when operated within 300 ft of the two-year floodplain.

d. At the end of each work shift, vehicles will be stored more than 300 ft (horizontal distance) from the two-year flood elevation or in an area approved by the City's construction manager.

e. Before operating within the two-year floodplain, all equipment will be cleaned of external oil, grease, dirt, or caked mud. Any washing of equipment will be conducted more than 300 ft from the two-year flood elevation and in a location that will not contribute untreated wastewater to any flowing stream.

f. No "green" or uncured concrete (less than 24 hours set-up time) or water having had contact with newly poured concrete will come in contact with flowing water or be disposed of within wetlands or the two-year floodplain.

2.3.4.3 Biological Evaluation Plan

As required by a condition of its FERC license, the City has developed a biological evaluation plan to monitor fish movement in the fish ladders after construction (City of Albany 2004c). The fish monitoring activities will become a part of a facilities operation and maintenance manual. This document will allow for adaptive management to occur during the maintenance of the fish ladders, and for monitoring and ensuring efficient fish passage through the ladders.

3. RANGE-WIDE STATUS OF THE LISTED SPECIES

3.1 Introduction

The first step NOAA Fisheries uses when applying the ESA Section 7(a)(2) to the listed ESUs considered in this Opinion is to evaluate the current status of the species at the ESU level with respect to biological requirements indicative of survival and recovery and the essential features of any designated critical habitat. Biological requirements are defined in section 4.1. The range-wide status of each of the listed ESUs considered in this Opinion is summarized in the following sections.

3.2 Listed Species Affected by the Proposed Action

This consultation considers whether the effects of the proposed actions are likely to jeopardize the continued existence of two listed species of Columbia Basin salmonids. The two species are:

Upper Willamette River (UWR) chinook salmon (*Oncorhynchus tshawytscha*); listed as threatened on March 24, 1999 [64 FR 14308])

Upper Willamette River (UWR) steelhead (*O. mykiss*); listed as threatened on March 25, 1999 [64 FR 14517])

On June 14, 2004, NOAA Fisheries published its proposed ESU listing determinations for Pacific salmon and steelhead in the Federal Register. NOAA Fisheries proposes no changes in status for either of the ESUs considered in this Opinion, even though it does propose to include the hatchery populations for both ESUs as well as resident populations of *O. mykiss* in the revised listing.

Although the listing determinations for UWR chinook salmon and UWR steelhead are not yet finalized, NOAA Fisheries uses the same information in this chapter as in the proposed listing determinations, because this is currently the best available scientific and commercial information on range-wide status.

3.3 Current Range-wide Status of Listed Species Affected by the Proposed Action

The best available scientific and commercial information with respect to the listing status, general life history, and population dynamics of each species included for evaluation in this Opinion are described in detail in NOAA Fisheries' June 14, 2004 proposed listing determinations for 27 ESUs of West Coast salmonids (69 FR 33102) and are summarized in the following sections.

NOAA Fisheries considered the recent high returns for many ESUs in its proposed listing determinations (69 FR 33114), from which the following information is excerpted. In the last decade, evidence has shown recurring, decadal-scale patterns of ocean-atmosphere climate

variability in the North Pacific Ocean. These oceanic productivity "regimes" have correlated with salmon population abundance in the Pacific Northwest and Alaska. Survival rates in the marine environment are strong determinants of population abundance for Pacific salmon and steelhead. However, because the confidence with which ocean-climate regimes can be predicted into the future is limited, our ability to project the future influence of ocean-climate conditions on salmonid productivity is limited. Even under the most optimistic scenario, increases in abundance might be only temporary and could mask a failure to address underlying factors for decline. It is reasonable to assume that salmon populations have persisted over time under pristine conditions through many such cycles in the past. Less certain is how the populations will fare in periods of poor ocean survival when their freshwater, estuary, and nearshore marine habitats are degraded.

3.3.1 UWR Chinook Salmon

The Willamette/Lower Columbia River Technical Recovery Team (W/LC TRT) (McElhany et al. 2004) identified seven demographically independent populations of UWR chinook salmon in a single major group. All of these populations are extant, although they vary in degree of viability.

3.3.1.1 Dam Counts and Returns

There are no direct estimates of the abundance of natural-origin spawners for the UWR chinook salmon ESU. The total abundance of adult spring chinook salmon (hatchery-origin plus natural-origin fish) passing Willamette Falls has remained relatively steady over the past 50-years (ranging from approximately 20,000 to 70,000 fish), but it is an order of magnitude below the peak abundance levels observed in the 1920s (approximately 300,000 adults). Interpretation of abundance levels has been confounded by a high but uncertain fraction of hatchery-produced fish until recent years. The McKenzie River population has shown substantial increases in total abundance (hatchery-origin and natural-origin fish) in the last two-years, while trends in other natural populations in the ESU are generally mixed.

The five-year geometric mean of the aggregate returns to the Clackamas and McKenzie Rivers was 312% higher during 2001-2003 than in 1996-2000 (Fisher 2004).

3.3.1.2 BRT Findings

The West Coast Salmon Biological Review Team (BRT) estimated that, despite improving trends in total productivity since 1995, productivity would be below replacement in the absence of artificial propagation (NOAA Fisheries 2003b). The BRT was particularly concerned that a majority of the historical spawning habitat and approximately 30 to 40% of total historical habitat are now inaccessible behind dams. The restriction of natural production to just a few areas increases the ESU's vulnerability to environmental variability and catastrophic events. Losses of local adaptation and genetic diversity through the mixing of hatchery stocks within the ESU and the introgression of out-of-ESU hatchery fall-run chinook represent threats to ESU

diversity. However, the BRT was encouraged by the recent closure of the fall-run hatchery and by improved marking rates of hatchery fish to assist in monitoring and in the management of a marked-fish selective fishery. The BRT found moderately high risks for all viable salmonid population (VSP) categories.

3.3.1.3 2004 Status Review

Seven artificial propagation programs in the Willamette River produce fish that are considered to be part of the UWR chinook salmon ESU. All of these programs are funded to mitigate for lost or degraded habitat and produce fish for harvest purposes. NOAA Fisheries' assessment of the effects of artificial propagation concluded that these hatchery programs collectively do not substantially reduce the extinction risk of the ESU in-total (NOAA Fisheries 2004c). An increasing proportion of hatchery-origin returns has contributed to increases in total ESU abundance. However, it is unclear whether these returning hatchery and natural fish actually survive over winter to spawn. Estimates of pre-spawning mortality indicate that a high proportion (more than 70%) of spring chinook in most ESU populations die before spawning. In recent years, hatchery fish have been used to reintroduce spring chinook back into historical habitats above impassable dams (e.g., in the North Santiam, McKenzie, and Middle Fork Willamette Rivers), slightly decreasing risks to ESU spatial structure. Within the ESU, hatchery fish exhibit different life history characteristics from natural ESU fish. High proportions of hatchery-origin natural spawners in remaining natural production areas (i.e., in the Clackamas and McKenzie Rivers) may thereby have negative impacts on within and among population genetic and life history diversity. Collectively, artificial propagation programs in the ESU have a slight beneficial effect on ESU abundance and spatial structure but neutral or uncertain effects on ESU productivity and diversity. Protective efforts, as evaluated pursuant to the "Policy for Evaluation of Conservation Efforts when Making Listing Determinations" (68 FR 15100m, March 28, 2003), did not alter the assessments of the BRT and the Artificial Propagation Evaluation Workshop participants that the ESU is "likely to become endangered within the foreseeable future." Efforts under the USFWS Greenspaces Program, the Oregon Plan, hatchery reform efforts, and other protective efforts are encouraging signs. However, restoration efforts in the ESU are very local in scale and have yet to provide benefits at the scale of watersheds or at the larger spatial scale of the ESU. The blockage of historical spawning habitat and the restriction of natural production areas remain to be addressed.

3.3.2 UWR Steelhead

The UWR steelhead ESU includes all naturally spawned populations of winter-run steelhead in the Willamette River in Oregon and its tributaries upstream from Willamette Falls to the Calapooia River (inclusive) (64 FR 14517; March 25, 1999). The W/LC TRT (McElhany et al. 2004) identified four extant, demographically independent populations in one major population group. NOAA Fisheries' June 14, 2004 listing proposal did not resolve the ESU membership of native resident populations that are above recent (usually man-made) impassable barriers but below natural barriers. It was provisionally proposed that these resident populations not be considered part of the revised UWR steelhead ESU, until such time that significant scientific

information becomes available to afford a case by case evaluation of their ESU relationships.

This ESU does not include any artificially propagated *s*teelhead stocks that reside within the historical geographic range of the ESU. Hatchery summer steelhead occur in the Willamette Basin but are an out-of-basin stock that is not included in the ESU.

3.3.2.1 Dam Counts and Returns

The BRT was encouraged by significant increases in adult returns (exceeding 10,000 total fish) in 2001 and 2002 for the UWR steelhead ESU. However, the recent five-year mean abundance remains low for an entire ESU (5,819 adults), and individual populations remain at low abundance. Long-term trends in abundance are negative for all populations in the ESU, reflecting a decade of consistently low returns during the 1990s. Short-term trends, buoyed by recent strong returns, are positive.

The five-year geometric mean of the aggregate counts at Willamette Falls Dam was 141% higher during 2001-2004 than in 1996-2000 (Fisher 2004).

3.3.2.2 BRT Findings

Approximately one-third of the ESU's historically accessible spawning habitat is now blocked. Notwithstanding the lost spawning habitat, the ESU continues to be spatially well-distributed, occupying each of the four major subbasins (the Molalla, North Santiam, South Santiam, and Calapooia Rivers) (NOAA Fisheries 2003b).

3.3.2.3 2004 Status Review

The BRT considered the cessation of the "early" winter-run hatchery program a positive sign for ESU diversity risk but remained concerned that releases of non-native summer steelhead continue. Because coastal cutthroat trout are dominant in the basin, resident steelhead are not as abundant or widespread here as in the inland proposed steelhead ESUs. The BRT did not consider resident fish to reduce risks to ESU abundance, and their contribution to ESU productivity, spatial structure, and diversity is uncertain. The BRT found moderate risks for each of the VSP categories.

4. ENVIRONMENTAL BASELINE

The environmental baseline includes "the past and present impacts of all Federal, State, or private actions and other human activities in the action area, including the anticipated impacts of all proposed Federal projects in the action area that have undergone Section 7 consultation and the impacts of State and private actions that are contemporaneous with the consultation in progress" 50 CFR §402.02. In step two of its analysis, NOAA Fisheries evaluates the relevance of the environmental baseline in the action area to the species current status. In describing the environmental baseline, NOAA Fisheries emphasizes important habitat indicators for the listed salmonid ESUs affected by the proposed action. NOAA Fisheries does not expect any areas other than the action area, described in section 4.1, to be directly or indirectly affected by the proposed action.

The operation of the City's hydroelectric facilities, following completion of the proposed construction activities, is not included within the environmental baseline even though operations have already been permitted by FERC. While the anticipated impacts of future Federal activities that have undergone Section 7 consultation are included in the baseline, FERC failed to undergo consultation in licensing future hydroelectric power operations. Therefore, while the upgrades encompassed by the proposed action are significant aspects of the FERC license, this consultation will only contemplate the indirect effects of those upgrades, and cannot consider all aspects of FERC-permitted operations. As a result, any incidental take that may be authorized by this Opinion will be strictly limited to cover the proposed construction activities, and not future operation of the constructed or renovated facilities.

4.1 Action Area

The "action area" is defined in 50 CFR §402.02 as "all areas to be affected directly or indirectly by the Federal action, and not merely the immediate area involved in the action." For the purpose of this consultation, the action area includes the City's construction area and non-construction areas, including the bankline, riparian area, and aquatic habitat of the South Santiam River at about RM 20.8, and extends downstream to include the aquatic habitat in the South Santiam River below the dam, and aquatic habitat in the mainstem Santiam River to its confluence with the Willamette River. The mainstem Santiam River is included due to potential water quality effects from construction activities.

4.2 Status of the Species Within the Action Area

4.2.1 UWR Chinook Salmon Life History, Distribution, and Abundance in the South Santiam River Basin

4.2.1.1 Historical Distribution and Abundance

Spring chinook salmon are native to the South Santiam River. Escapement to the South Santiam River was estimated to be 1,300 in 1947, with the primary spawning areas located above the town of Foster (Mattson 1948). Hatchery broodstock collection efforts began in 1923 with a weir placed across the river near the town of Foster (Wallis 1961). In addition to mainstem spawning in the South Santiam and Middle Santiam Rivers, spring chinook salmon were also observed spawning in the major tributaries, including Thomas, Crabtree, and Quartzville Creeks (Thompson et al. 1966; Fulton 1968). Construction of Foster and Green Peter Dams by the Corps blocked or impaired access to much of the area where Mattson (1948) observed chinook spawning during 1947. The South Santiam Hatchery began operations in 1966 to mitigate for loss of spawning areas above Foster Dam.

Thompson et al. (1966) estimated a total annual run size (natural and hatchery origin) of 3,700 adults during the 1960s. Estimates based on the sport catch and returns to Foster Dam indicate that the minimum total (natural plus hatchery origin) run size to the subbasin during the 1970s and 1980s varied from less than 500 to nearly 10,000 per year.

4.2.1.2 Adult Migration and Spawning Timing

Adult spring chinook salmon begin appearing in the Lower Willamette River in February, but the majority of the run ascends Willamette Falls in April and May, with a peak in mid May (Myers et al. 2003). Adults begin entering the Santiam subbasin in mid May, with peak migration from late May through early June (ODFW 1992). Spawning of spring chinook in the Santiam subbasin generally begins in August and continues into early October, with the median date usually falling in the later half of September (ODFW 1992).

4.2.1.3 Productivity

Systematic aerial surveys began for fall chinook on the Santiam River system in 1970. Redd counts in the South Santiam River upstream of Lebanon Dam ranged from 10 to 144 during 1970 and 1993, and are most likely attributable to spring chinook (Willis et al. 1995).
Spawning ground survey data reported in Lindsay et al. (1999) indicated 163 spring chinook redds in the South Santiam River below Foster Dam during September 1998. A 2002 survey of 50.8 stream miles in the South Santiam River below Foster Dam found 982 redds (Firman et al. 2002). Further, Firman et al. (2002) estimated a natural-origin run of spring chinook salmon to the South Santiam River subbasin of 965 fish in 2002, based on counts of naturally spawned carcasses and the number of unmarked fish taken for hatchery broodstock at Foster Dam.

Beginning in 1994, ODFW transported and released spring chinook that returned to the Foster trap into areas above Foster Reservoir in an effort to reestablish a naturally-producing run (ODFW 2001a). The annual number released ranged from several hundred to nearly one thousand. Snorkel surveys above Foster reservoir between 1998 through 2001 indicated significant natural production in this area (ODFW 2002). Of 556 adult spring chinook released above Foster in 2003, most (73%) were unclipped (Firman et al. 2004). ODFW has also released spring chinook trapped at Foster into Crabtree and Thomas creeks, tributaries to the South Santiam below Foster, as well as into other Willamette Basin tributaries (Abiqua Creek and the Calapooia River) (Firman et al. 2004).

4.2.1.4 Timing of Emergence and Juvenile Outmigration

UWR spring chinook salmon are ocean-type juveniles that typically enter saltwater either as fry migrants that migrate at 60 to 150 days after hatching or as fingerling migrants that migrate in the late summer or autumn of their first year (Myers et al. 1998). However, if environmental conditions are not conducive to subyearling out migration, ocean-type chinook salmon juveniles may remain in fresh water for the first year after hatching (Myers et al. 1998). There is little data available specific to the South Santiam River on juvenile spring chinook rearing and outmigration.

4.2.1.5 Hatchery Production

Hatchery produced spring chinook have been present in the South Santiam River since egg collection activities began in 1923, when a weir was placed across the river near the town of Foster (Mattson 1948; Wallis 1961). Sporadic and inefficient operation of the weir probably allowed a large portion of the run to escape upstream (Wallis 1961). In other years, the hatchery may have taken all the naturally-produced adults each year for broodstock. The South Santiam Hatchery began operations in 1966 to mitigate for Foster Dam, which blocked spring chinook salmon from nearly all their historical spawning areas.

4.2.1.6 Harvest

Willamette spring chinook salmon are caught primarily in the Southeast Alaskan and North-Central British Columbia ocean fisheries.

4.2.1.7 Habitat Use in the Construction Area

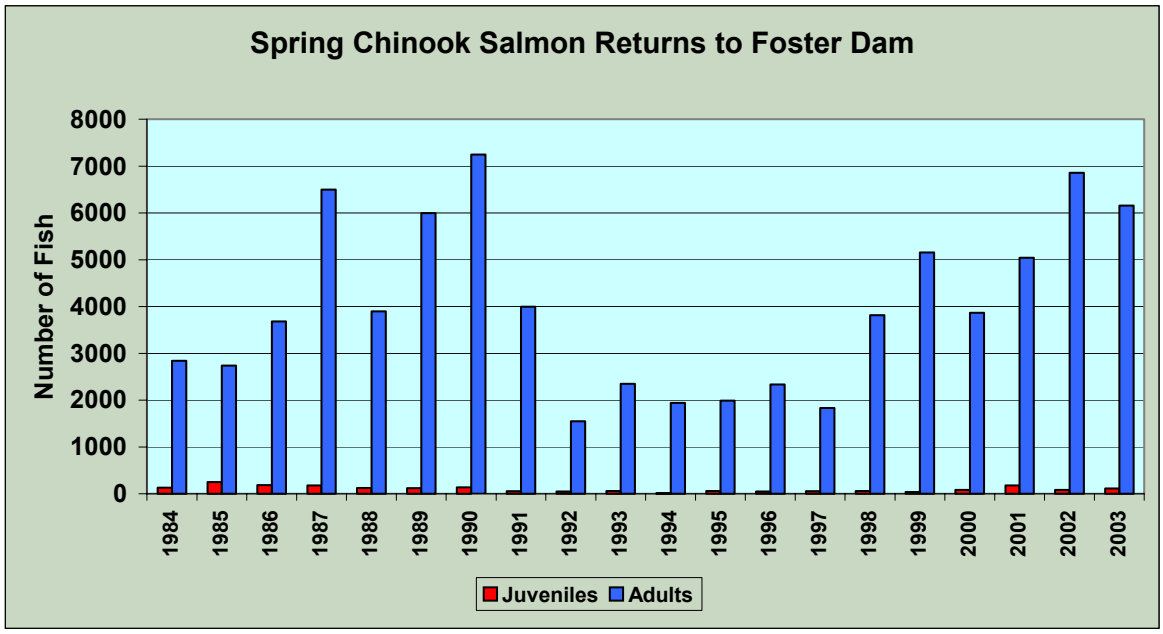
The South Santiam River in the immediate vicinity of the construction area is used by UWR chinook salmon primarily for upstream and downstream migration. Juvenile chinook rear and feed during their downstream migration. There is limited available spawning habitat immediately and slightly below the dam because of a large proportion of bedrock. Likewise, bedrock appears to limit the availability of spawning habitat in the backwatered area upstream of the dam. However, most spring chinook salmon spawning is believed to occur in the South

Santiam River just below Foster Dam and in tributaries both upstream and downstream of Lebanon Dam (South Santiam Watershed Council (SSWC) 2000).

4.2.1.8 Recent Abundance in South Santiam Subbasin

Spring chinook salmon are counted at Foster Dam. Figure 4-1 presents aggregate (naturally spawning and hatchery) juvenile and adult returns from 1984 to 2003 (ODFW 2003). Adult returns peaked in 1990 at more than 7,000. From 1991 to 1997, returns were below average, but they have steadily increased since 1997.

Figure 4-1 Spring chinook salmon returns to Foster Dam (1984 to 2003)



ODFW's spawner counts in the South Santiam River system (including Thomas Creek, Crabtree Creek, and South Santiam River above Foster Dam) indicate that numbers of redds increased from 1997 to 2001, but declined significantly in 2002 (ODFW 2003). Table 4-1 provides a summary of the results.

Table 4- 1

South Santiam subbasin spring chinook salmon spawning survey summary (ODFW 2003).				
Year	**Miles Surveyed**	**Redds**	**Redds/Mile**	**Numbers of Adults Released in Habitat**
1996	1.9	12	6.3	120
1997	1.9	28	14.7	431
1998	10.2	45	4.4	846
1999	13.0	84	6.5	618
2000	18.3	107	5.8	1,030
2001	14.5	165	11.4	1,942
2002	22.7	28	1.2	2,137

4.2.2 Winter Steelhead Life History, Distribution, and Abundance in the South Santiam River Basin

4.2.2.1 Historical Distribution and Abundance

Winter steelhead spawned historically in the Upper South Santiam River subbasin, above the sites of Foster and Green Peter Dams, as well as in downstream tributaries (ODFW 1992). Buchanan et al. (1993) estimated that 2,600 winter steelhead spawned in the upper mainstem of the South Santiam River and Thomas, Crabtree, McDowell, Wiley, Canyon, Moose, and Soda Fork Creeks. No estimates of pre-1960s abundance are available for the UWR steelhead ESU.

However, inadequate downstream passage at Foster and Green Peter Dams, and inadequate upstream passage at the latter facility are believed to have caused up to a 75% reduction in the native steelhead population in the upper subbasin (Corps 2000).

4.2.2.2 Adult Migration and Spawning Timing

UWR winter steelhead are ocean-maturing fish. Most return at age four-years, with a small proportion returning as five-year-olds (Busby et al. 1996). Adult winter steelhead enter the Lower Willamette River beginning in January and February, but do not ascend to their spawning areas until late March or April (Myers et al. 2003). In the South Santiam River subbasin, adults arrive at Foster Dam from February through June, with the peak of the run usually in mid April (ODFW 1992). Spawning occurs during April and May with the peak occurring in late April and early May. This run timing is possibly an adaptation for ascending Willamette Falls, which functions as an isolating mechanism for UWR winter steelhead (Myers et al. 2003).

4.2.2.3 Productivity

The Santiam River subbasin provides the majority of the winter steelhead production in the Willamette River Basin (ODFW 1992). For the UWR winter steelhead ESU as a whole, NOAA Fisheries estimates that the median population growth rate during the base period ranges from 0.94 to 0.87, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared to that of fish of wild origin (NOAA Fisheries 2003b). Winter and summer steelhead have been counted at Willamette Falls since 1949 and 1970, respectively. Mean value of winter steelhead from 1949 to 2000 is approximately 9,021. Mean value of summer steelhead from 1970 to 2000 is 12,416. Fish counts can be obtained from the ODFW website at the following link: http://query.streamnet.org/Request.cfm?cmd=BuildCriteria&NewQuery=BuildCriteria&Required=Run,State&DataCategory=4&State=4&Dam=51309.

The NOAA Fisheries' BRT noted abundance of natural origin winter steelhead trout was between 239 and 496 spawners for data years 1967-2002 at Foster Dam (RM 38) (NOAA Fisheries 2003b).

4.2.2.4 Timing of Emergence and Juvenile Outmigration

Buchanan et al. (1993) stated that steelhead smolts migrated past Green Peter Dam from mid April to late May and past Foster Dam during mid April through mid May.

4.2.2.5 Hatchery Production

The main hatchery production of native (late-run) winter steelhead in the Santiam River subbasin occurred in the North Fork Santiam River, where estimates of hatchery proportions in natural spawning areas ranged from 14 to 54 % (Busby et al. 1996). ODFW (1990) released approximately 100,000 steelhead smolts each year, mostly into the mainstem North Santiam River and Big Cliff Reservoir. Estimates of the percentage of naturally spawning fish attributable to hatcheries in the late 1990s were 17 % in the North Santiam (Chilcote 1998). Steelhead smolt releases stopped after 1998, and the last group's three-year-old spawners returned in 2001, while the four-year-olds returned in 2002 (NOAA Fisheries 2003b).

4.2.2.6 Harvest

Winter steelhead are caught primarily in freshwater fisheries. In response to poor returns above Willamette Falls, the ODFW implemented regulations prohibiting retention of this species throughout the Willamette River Basin, and fishery impact rates decreased to about 2 % (ODFW 2001b).

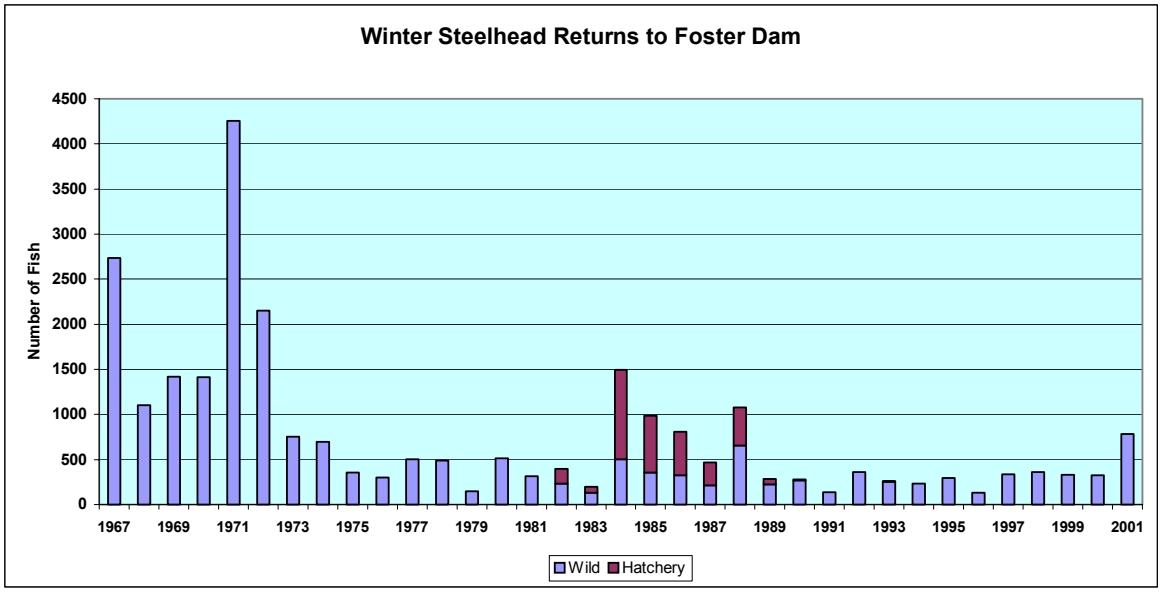
4.2.2.7 Habitat Use in the Construction Area

The South Santiam River in the immediate vicinity of the construction area is used by UWR steelhead primarily for upstream and downstream migration. Juvenile steelhead rear and feed during their downstream migration. There is limited available spawning habitat above and below the dam because of a large proportion of bedrock. However, most UWR steelhead spawning is believed to occur in the South Santiam River just below Foster Dam and in tributaries both upstream and downstream of Lebanon Dam (SSWC 2000).

4.2.2.8 Recent Abundance in the South Santiam River Subbasin

Summer and winter steelhead counts are conducted at Foster Dam. Figure 4-2 presents returns from 1967 to 2001 for winter steelhead (ODFW 2003). During this period, returns peaked in 1971, with more than 4,000 returns. Since that date, average returns have been less than 500. Hatchery returns were evident in the 1980s.

Figure 4-2 Winter steelhead returns to Foster Dam (1967 to 2001)



ODFW winter steelhead spawning records on Wiley Creek (a tributary; its confluence with the South Santiam River is directly below Foster Dam) indicate a peak in winter steelhead spawning in 1985 (ODFW 2003). Table 4-2 provides a summary of those results.

Table 4- 2

South Santiam subbasin winter steelhead spawning survey summary (ODFW 2003).		
Year	**Redds**	**Redds/Mile**
1980	62	47.7
1985	93	71.5
1986	9	6.9
1987	20	15.4
1991	22	16.9
1992	44	33.8
1993	13	10
1994	16	12.3
1995	5	3.8
1996	4	3.1
1997	11	8.5
1998	12	9.2
1999	No survey	No survey
2000	9	6.9
2001	39	30.0
2002	42	32.3
2003	19	14.6

4.3 Status of Habitat Features

The environmental baseline encompasses the effects of both human and natural factors leading to the current status of the species, but does not incorporate impacts specific to the proposed action. Therefore, future impacts resulting from the future operation of the dam and canal facilities and other activities authorized under the proposed action are not part of the environmental baseline. Rather, the environmental baseline describes the current status of the species, the effect of historical dam and canal operations, and the factors currently affecting the species within the action area. The resulting "snapshot" of the species' health within the action area provides the relevant context for evaluating the anticipated effects of the proposed action on the ESU's likelihood of survival and recovery relative to its biological requirements.

Habitat-altering actions affect the viability of salmon populations, frequently in a negative manner. However, it is often difficult to quantify the effects of a given habitat action in terms of its impact on biological requirements for individual salmon (whether in the action area or outside of it). Thus, while it is often possible to draw an accurate picture of a species' range-wide status, and doing so is a critical consideration in any jeopardy analysis, it is difficult to determine how that status may be affected by a given habitat-altering action. With the current state of the science, usually the best that can be done is to determine the effects an action has on a given habitat component and, since there is a direct relationship between habitat condition and population viability, extrapolate that to the impacts on the species as a whole. Thus, by examining the effects a given action has on the habitat portion of a species' biological requirements, NOAA Fisheries has a gauge of how that action will affect the population variables that constitute the rest of a species' biological requirements and, ultimately, how the action will affect the species' current and future health.

Ideally, reliable scientific information on a species' biological requirements would exist at both the population and the ESU levels, and effects on habitat should be readily quantifiable in terms of population impacts. In the absence of such information, NOAA Fisheries' analyses must rely on generally applicable scientific research that one may reasonably extrapolate to the action area and to the population(s) in question. Therefore, for actions that affect freshwater habitat, NOAA Fisheries usually defines the biological requirements in terms of a concept called properly functioning condition (PFC). PFC is the sustained presence of natural habitat forming processes in a watershed (e.g., riparian community succession, bedload transport, precipitation runoff pattern, channel migration) that are necessary for the long-term survival of the species through the full range of environmental variation. PFC, then, constitutes the habitat component of a species' biological requirements. The indicators of PFC vary between different landscapes, based on unique physiographic and geologic features. For example, aquatic habitats on timberlands in glacial mountain valleys are controlled by natural processes operating at different scales and rates than are habitats on low-elevation coastal rivers.

In the PFC framework, baseline environmental conditions are described as "properly functioning" (PFC), "at risk" (AR), or "not properly functioning" (NPF). If a proposed action would be likely to impair properly functioning habitat, appreciably reduce the functioning of already impaired habitat, or retard the long-term progress of impaired habitat toward PFC, it will usually be found likely to jeopardize the continued existence of the species or adversely modify its critical habitat, or both, depending upon the specific considerations of the analysis. Such considerations may include, for example, the species' status, the condition of the environmental baseline, the particular reasons for listing the species, any new threats that have arisen since listing, and the quality of the available information.

Since lotic habitats are inherently dynamic, PFC is defined by the persistence of natural processes that maintain habitat productivity at a level sufficient to ensure long-term survival. Although the indicators used to assess functioning condition may entail instantaneous measurements, they are chosen, using the best available science, to detect the health of underlying processes, not static characteristics. "Best available science" advances through time; this advance allows PFC indicators to be refined, new threats to be assessed, and species status and trends to be better understood. The PFC concept includes a recognition that natural patterns of habitat disturbance will continue to occur. For example, floods, landslides, wind damage, and wildfires result in spatial and temporal variability in habitat characteristics, as will anthropogenic perturbations.

The following sections describe the status of various habitat characteristics, "indicators" compared to properly functioning condition of each indicator within the action area. The habitat indicators associated with "Watershed Condition" apply to the entire South Santiam River watershed, as their effects transfer downstream into the action area. As described in section 2.4, the action area encompasses the construction area and non-construction area lands, including the bankline, riparian area, and aquatic habitat of the South Santiam River at about RM 20.8, and extends downstream to the Santiam River, and further downstream to the confluence with the Willamette River due to potential water quality effects from construction activities.

4.3.1 Physical Description of the South Santiam River Basin

The South Santiam River is approximately 66 miles long and drains an area of approximately 1,000 square miles in Linn County. The headwaters are in the geologically older Western Cascades. The profile of the upper river generally reflects the transition from resistant volcanic basalts and tuffaceous deposits to easily eroded alluvial materials. The lower 38 miles of the South Santiam River, below the Middle Santiam River, flow through relatively flat geography. The channel slope decreases to approximately 0.4 % between RM 35 and Lebanon, and decreases to less than 0.1 % in the alluvial valley (Corps 2000). The South Santiam River joins the North Santiam River 11.7 miles above the confluence of the Santiam and the Willamette Rivers (Figure 4-3).

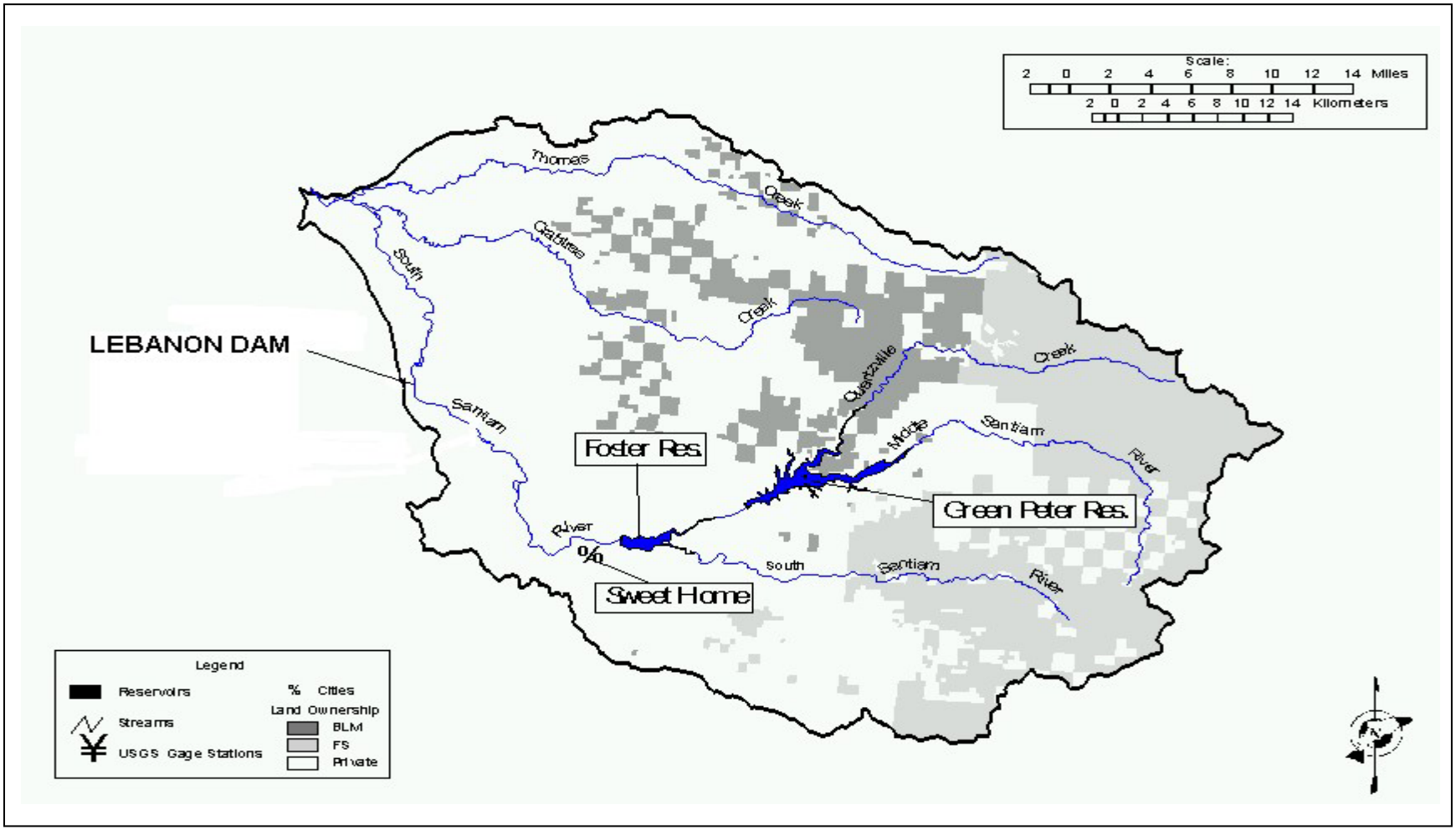


Figure 4-3 The South Santiam River subbasin, showing location of City of Albany's Lebanon Dam.

Streamflow in the South Santiam River Basin reflects seasonal distribution, with most of the runoff occurring during the winter and low flows occurring during July and August. Flows in the Lower South Santiam River have been controlled by Green Peter Dam and Foster Dam since construction of these multipurpose facilities was completed by the Corps in 1968 (Corps 2000). Green Peter, at RM 6 of the Middle Santiam River, is the primary flood control dam, regulating runoff from 227 square miles of the upper basin. Foster Dam is located at the confluence of the Middle and South Santiam Rivers, at RM 38 on the South Santiam River (Figure 4-3). Foster Dam provides some additional runoff storage, and reregulates flow released from the Green Peter Dam (Corps 2000).

Flood control operations at the Corps' dams have substantially decreased the high flow events in the lower river. Flows have decreased, from a highest recorded flow of 95,200 cfs in December 1964 (USGS 1997), to 29,300 cfs (Corps 2000) since construction of the Corps' dams. During summer and early fall, the average daily flow in August before dam construction was 261 cfs (USGS 1990). Since the Corps' dams were constructed, the average daily flow in August has increased to 816 cfs (USGS 1990) because these Corps' projects release water later in the year for flow augmentation purposes.

4.3.2 Water Quality

4.3.2.1 Chemical Contaminants and Nutrients

Status Relative to Properly Functioning Condition

NOAA Fisheries defines PFC as low levels of contamination with no applicable reaches designated by DEQ on its 303(d)[2] list. NOAA Fisheries defines the AR category as one 303(d) designated reach or where NOAA Fisheries is specifically aware of information indicating contaminants that rise to this level of concern (NOAA Fisheries 1996). The criteria for pH applicable to the Santiam and South Santiam River Basins is between 6.5 and 8.5 (DEQ 2002).

The DEQ conducts water quality monitoring at stations on the Santiam River. The South Santiam River from RM 0 to 25.9 was not a designated stream reach on either DEQ's 1998 or 2002 final 303(d) lists for pH (DEQ 1998; DEQ 2002). DEQ monitored for pH from 1986 through 1995, at RM 7.9, and concluded that pH criteria were attained for summer (1998 list) and fall, winter and spring (2002 list). In addition, DEQ did not designate the Santiam River from RM 0 to 12 on either its 1998 or 2002 final 303(d) lists for pH *(ibid)*. DEQ monitoring of the Santiam River at RM 9.6 from 1980 through 1985 and concluded that pH criteria are attained year round (*ibid*).

[2]Under Section 303(d) of the 1972 Clean Water Act, states, territories, and authorized tribes are required to develop lists of impaired waters. These impaired waters do not meet water quality standards that states, territories, and authorized tribes have set for them, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for waters on the lists and develop total maximum daily loads (TMDLs) for these waters.

Conclusion

Because pH criteria have been met in the action area and this reach is not on DEQ's 303(d) list, NOAA Fisheries rates this indicator as attaining PFC within the action area.

4.3.2.2 Water Temperature

Status Relative to Properly Functioning Condition

NOAA Fisheries defines PFC for water temperature as water temperatures not exceeding the criteria established by DEQ and approved by the U.S. Environmental Protection Agency. Water temperatures up to 12.8°C in spawning habitat and 17.8°C in rearing and migration habitats are considered to be PFC; temperatures exceeding 12.8°C in spawning habitat and 17.8°C in rearing and migration habitat are considered to be NPF.

Currently, the mainstem Santiam River, RM 0 to 12, from the mouth upstream to the confluence of the North Santiam and South Santiam Rivers, is listed for temperature on the DEQ section 303(d) list for both spawning and rearing criteria (DEQ 1998; DEQ 2002). Moreover, the South Santiam River from RM 0 to 25.9 has been listed for exceeding the same temperature criteria.

Flow discharging from Foster Dam is 7°C to 11°C cooler in the summer and up to 2°C to 3°C cooler in the fall than prior to construction of Foster and Green Peter Dams (COE 2000). However, by the time the flows reach the middle and Lower South Santiam River, water temperatures become significantly elevated. Water temperatures in the diverted area below Lebanon Dam during the July 1 to September 14 period regularly exceed the 17.8°C rearing criterion in both the mainstem Santiam and South Santiam Rivers (DEQ 1998). During the September 15 to June 30 period, water temperatures in both rivers frequently exceed DEQ's 12.8°C spawning criterion (DEQ 2002).

Conclusion

Due to documented exceedences of the 17.8°C rearing and the 12.8°C spawning criteria in the action area of the Santiam and South Santiam Rivers below the dam, NOAA Fisheries rates this indicator as NPF.

4.3.2.3 Dissolved Oxygen

Status Relative to Properly Functioning Condition

NOAA Fisheries defines PFC as dissolved oxygen (DO) concentrations which meet the DEQ standards (DEQ 1999). During the periods of spawning until fry emergence, DO in the water column must not be less than 11.0 mg/L. However, if the minimum intragravel DO, measured as a spatial mean, is 8.0 or greater, then the water column DO criterion is 9.0 mg/L. During periods of salmonid rearing, DO in the water column must not be less than 8.0 mg/L.

DEQ monitored DO at RM 7.6 of the South Santiam River, between 1986 and 1995, and found that 0% of the August values exceeded the 8.0 mg/L standard for salmonid rearing (DEQ 1998; DEQ 2002). At the same station, DEQ found that 2% of September through July values exceeded its 11.0 mg/L standard for salmonid spawning. The South Santiam River is not designated on DEQ's 303(d) list for DO (*ibid*).

In the mainstem Santiam River, at RM 9.3, DEQ reports 4 out of 10 samples did not meet the 11.0 mg/L standard for salmonid spawning. DEQ added the mainstem Santiam River, from RM 0 to 12, to its 303(d) list for not attaining the DO spawning criterion (*ibid*).

The causes of low DO in the Santiam River Basin are not clearly defined. The basin drains lands primarily used for agriculture and logging operations, resulting in nonpoint sources of organic materials during periods of high rainfall (Cude 1996). Additionally, treated discharges from municipal sewage treatment plants at Sweet Home and Lebanon are considered point sources. These pollution sources contribute to high levels of total phosphates and biochemical oxygen demand, which, together with elevated water temperature, decrease DO during certain periods of the year (Cude 1996).

Conclusion

Because the mainstem Santiam River does not meet DEQ standards for spawning habitat, NOAA Fisheries rates this indicator as AR within the action area.

4.3.2.4 Sediment/Turbidity

Status Relative to Properly Functioning Condition

NOAA Fisheries defines PFC as less than 12% fines in gravel and low turbidity (NOAA Fisheries 1996).

DEQ has not designated either the mainstem Santiam River or the South Santiam River in the action area on its 303(d) list for sediment and turbidity (DEQ 1998; DEQ 2002). Transport of sediment supplied from approximately 50 % of the South Santiam River subbasin was blocked after construction of Foster and Green Peter Dams (Corps 2000). Further, the stream's sediment

transport capacity has been reduced below these Corps dams because maximum flows are less than the pre-dam two-year interval event.

Downstream of the Corps' dams, however, the South Santiam River continues to receive sediment from Hamilton, McDowell, Crabtree, and Thomas Creeks. Water quality monitoring by the South Santiam Watershed Council detected high turbidity levels in these tributaries and in the South Santiam River at the dam (SSWC 2000). The SSWC concluded that turbidity was a potential concern throughout the Lower South Santiam watershed and needed further characterization to better understand its sources and variability.

Assorted land uses contribute to turbidity in the South Santiam River, including forestry and agricultural practices, road construction, and municipal runoff (FERC 1998b). Dominant land uses in the Lower South Santiam River are agriculture and forestry (SSWC 2000). ODFW noted that increased stream sedimentation and turbidity result from mass wasting and bank erosion (ODFW 1990). ODFW identified moderate to high risks of mass wasting associated with timber harvest and road construction in the Middle and South Santiam River Basins, and cited McDowell Creek as an example of accelerated bank erosion resulting from agricultural practices along riparian corridors.

Conclusion

Because there is some documentation of high turbidity in the action area, NOAA Fisheries rates this indicator as AR within the action area.

4.3.3 Habitat Access and Passage

Status Relative to Properly Functioning Condition

NOAA Fisheries defines PFC as fish passage upstream and downstream at any artificial barriers at all flows without significant levels of mortality or delay (NOAA Fisheries 1996).

Upstream Passage

Upstream fish passage facilities at the dam have been identified as inadequate in numerous environmental reviews (ODFW 1990; FERC 1998b; Corps 2000; SSWC 2000). Despite the presence of four fish ladders, adult salmonids are observed pooled below fishway entrances and unsuccessfully leaping at the face of the dam (NOAA Fisheries 2004d) The center fishway was constructed with the original dam in 1925 (CH2M HILL 2004a). Three more fishways were added over the years, one on either side of the river and a third near the center of the river. The last fishway was completed in 1972. While all of these additions were intended to aid upstream fish migration, these modifications have had varying degrees of effectiveness and are not designed to current NOAA Fisheries criteria.

In addition to the existing fish ladders, the diversion dam includes a system of wooden flashboards installed across the top of the dam. These boards raise the river water surface

elevation behind the dam by an additional 2 to 3 ft during critical low summertime river flows, in order for the City to divert sufficient water into the canal to meet authorized water rights (CH2M HILL 2004a). However, portions of these flashboards fail or are blown out during annual high winter flows. This interferes with fish passage because the missing boards create concentrated chutes of attraction water that confuse migrating fish searching for a route over the dam.

Downstream Passage

The canal intake is the largest unscreened diversion on the South Santiam River below the Corps' Foster and Green Peter Dams (SSWC 2000; ODFW 1990). Although no specific studies have been conducted at the intake to determine the number and rate of entrainment of juvenile and adult UWR spring chinook and UWR steelhead, the City and others have acknowledged the need to screen this diversion. (City of Albany 1994a; FERC 1998b; SSWC 2000).

Prior to seeking a FERC license, the City diverted water into the canal for both hydropower and non-power uses (CH2M HILL 2004a). After the City determined the need for a FERC license, it ceased diverting for hydropower purposes pending completion of licensing and construction of facilities required by license conditions. However, water has been diverted year round to meet other non-power uses, including municipal water supply and irrigation (CH2M HILL 2004a).

Conclusion

Due to existing effects, including the delay and stress associated with upstream passage at the dam and entrainment of downstream migrating fish at the intake canal, NOAA Fisheries rates this indicator as NPF.

4.3.4 Habitat Elements

4.3.4.1 Substrate

Status Relative to Properly Functioning Condition

NOAA Fisheries defines PFC as predominantly gravel and cobble substrate with clear interstitial spaces and less than 20 % embeddedness (NOAA Fisheries 1996). The supply and movement of sediment in a river system can affect aquatic habitat and water quality. Bedload sediment, which moves by rolling and hopping along the bed of a river, is important for shaping aquatic habitat and providing spawning and rearing areas for fish and invertebrates.

Foster and Green Peter reservoirs trap most of the sediment transported from the Upper South Santiam, Middle Santiam, and Quartzville watersheds, which constitute half of the area within the South Santiam watershed (Corps 2000). Consequently, the reaches downstream of Foster Dam lack a steady source of sediment from the headwater streams that historically would have supplied sufficient quantities of sediment to form and maintain complex substrate. However, sediment inputs continue from tributaries below Foster Dam, such as Wiley, McDowell and Hamilton creeks. A 1979 survey indicated that tributaries to the South Santiam River contain a wide variety of habitats ranging from streams cascading down steep gradients with medium sized boulders present to streams with numerous pools and riffles. Substrates include cobble, gravel, and large boulders (Ely 1981). As discussed in subsequent sections, reduced large wood inputs, reduced sinuosity, and fewer side channels in the Lower South Santiam River have decreased the channel's ability to retain gravel, resulting in increased scouring and bedrock.

Little quantitative data is available to describe substrate composition and embeddedness in the Lower South Santiam and Santiam Rivers. The City conducted habitat mapping in the South Santiam River from the dam downstream to the confluence with the North Santiam River (City of Albany 1994a). Substrate was large, ranging from bedrock and boulders to cobbles and large gravel. Some backwater areas and side channels had silt and sand bottoms, but most other areas were dominated by large gravel, cobble, and rubble. Average substrate size decreased in a downstream direction. Redds were observed throughout the reach, presumably made by fall chinook salmon (City of Albany 1994a).

Conclusion

Limited quantitative data indicates substrate is comprised of large gravel and larger substrate types in the Lower South Santiam River. Other sources indicate that interception of gravels from upstream dams and the lack of channel sinuosity and large wood may be limiting habitat formation processes in the lower river. Based on this information, NOAA Fisheries rates this indicator as AR in the action area.

4.3.4.2 Large Wood

Status Relative to Properly Functioning Condition

NOAA Fisheries defines PFC as greater than 80 pieces of wood per mile which are greater than 24 inches in diameter and greater than 50 ft long (NOAA Fisheries 1996).

The South Santiam River downstream of Foster Dam lacks a steady source of large wood from its headwater streams, which constitute half of the area within the South Santiam watershed (Corps 2000). The Corps removes all large wood that enters Foster and Green Peter reservoirs. In the past, large wood was removed from stream channels to aid navigation, recreation and fish passage. Additionally, historic log drives, removal of wood for navigation and flood control purposes, and forestry and agricultural practices, including reduction in mature riparian trees, have reduced the amount of large wood in the river channel (CH2M HILL 2004a).

No quantitative large wood estimates are available for the Lower South Santiam and Santiam Rivers, yet numerous sources conclude that insufficient large wood exists in these river channels at present and that large wood cannot be naturally replenished in the Lower South Santiam from local sources (Corps 2000; CH2M HILL 2004a; SSWC 2000).

Conclusion

Because large wood density is considered low in the action area and is not being naturally replenished from upstream sources, NOAA Fisheries rates this indicator as NPF.

4.3.4.3 Off-Channel Habitat

Status Relative to Properly Functioning Condition

NOAA Fisheries defines PFC for off-channel habitat as backwaters and side channels with cover and low-energy, off-channel areas, including ponds and oxbows (NOAA Fisheries 1996).

The South Santiam River below Foster Dam was described in 1947 as being extremely sinuous, divided by large islands in many places, and actively eroding (Corps 2000). Today, the South Santiam River is primarily confined to a single main channel, with few active gravel bar surfaces. The river has few perennial secondary channels, and many abandoned alcoves, meander bends, and side channels are visible on aerial photographs. As of 1989, more than 15 miles of channel bank in the Lower South Santiam River were protected by rip-rap or revetments, so that 35 % of the channel downstream of RM 19 has artificial banks (Corps 1989). SSWC (2000) identified 25 rip-rap bank treatments along the Lower South Santiam River below Foster Dam. Revetments, combined with reduced frequency of channel-forming flows and decreased sediment and large wood inputs, can prevent formation and maintenance of complex habitat including side channels and gravel bars.

While no quantitative data are available that document a loss in channel complexity downstream of Foster Dam, it is likely that the Lower South Santiam has lost side channel, alcove, and floodplain habitat as has been documented in other regulated Willamette River tributaries, such as the Middle Fork Willamette and McKenzie.

Conclusion

Based on evidence of loss of secondary channels, alcoves and off-channel ponds, and that nearly 35 % of the channel below the dam is constrained by revetments and other reinforcements, NOAA Fisheries rates this habitat indicator as NPF.

4.3.4.4 Pool Frequency/Quality

Status Relative to Properly Functioning Condition

NOAA Fisheries defines PFC for pool frequency based on channel width; the standard for the lower portion of the action area is at least 18 pools/mile (NOAA Fisheries 1996). Pool quality for PFC is defined as pools greater than one meter deep with cover, cool water, and low amounts of fine sediment.

The City conducted habitat mapping in the South Santiam River from the dam downstream to the confluence with the North Santiam River (City of Albany 1994a). Pools and "Deep Pool-Glide" habitat types were frequent, together comprising more than 40 % of the 18 mile reach. Pools were categorized as those units with greater than 6 ft depth, whereas "Deep Pool-Glides" were from 5 to 10 ft deep. These data do not compare directly to NOAA Fisheries standard of 18 pools/mile; however, the data indicate that pools in the action area are frequent and deep. However, as noted above in 4.2.4.2, large wood recruitment in the action area is insufficient to provide good cover habitat.

Conclusion

Because pools in the action area are frequent and deep, but lacking in large wood recruitment for cover, NOAA Fisheries rates this indicator as AR.

4.3.4.5 Refugia

Status Relative to Properly Functioning Condition

NOAA defines PFC for refugia as quiet water habitat buffered by riparian reserves and of sufficient size, number, and connectivity to maintain a viable population.

The Lower South Santiam River provides few refugia habitats, of insufficient size and inadequately buffered by intact riparian reserves (CH2M HILL 2004a). With more than 35 % of the channel in the action area constrained by revetments, the amount of available refugia is limited (Corps 1989). Revetments, combined with reduced frequency of channel-forming flows and decreased sediment and large wood inputs, can prevent formation and maintenance of complex habitat, including refugia habitat.

Conclusion

Because the channel is constrained in the action area and refugia are infrequent and of insufficient size, NOAA Fisheries rates this indicator as NPF.

4.3.5 Channel Dynamics

4.3.5.1 Channel Morphology

Status Relative to Properly Functioning Condition

Channel morphometry is the result of geologic conditions and processes combined with hydrologic conditions. Channel morphological conditions (e.g., point bars, meanders) and processes (e.g., avulsion, aggradation, degradation) broadly affect a stream's habitat characteristics for all inland life stages of anadromous fish (e.g., pools, riffles, runs, side-channels). In determining whether the channel conditions in the baseline are properly functioning, NOAA Fisheries considers main-channel morphology, streambank conditions, and floodplain connectivity. NOAA Fisheries defines PFC for channel morphometry as a width/depth ratio less than 10 (NOAA Fisheries 1996). The nature and magnitude of human caused changes as they relate to fish habitat and survival are considered in NOAA Fisheries' analysis. Channel conditions are also linked to other habitat indicators discussed elsewhere in this Opinion, including sediment supply and transport, large wood, and hydrology.

The lower reaches of the South Santiam River average 150 ft wide and about 4 ft deep (City of Albany 1994a). The width to depth ratio based on these averages is 37.5, significantly higher than that defining PFC. The riparian area adjacent to the Lower South Santiam River has been impacted by human development, and the channel is constrained by revetments (SSWC 2000). Foster and Green Peter Dams in the upper basin intercept large wood and sediment, likely causing downcutting, substrate coarsening, and simplification of the channel. Additionally, these Corps' dams have reduced the frequency of channel-forming flows, resulting in less sinuosity and complexity in the Lower South Santiam River (Corps 2000).

Lebanon Dam has also affected channel morphology in the immediate areas above and below the dam by promoting deposition in the pool above the dam and scouring below the dam. However, these localized effects have had less impact on channel morphology in the action area than that associated with the large Corps' dams upstream and with the substantial bank stabilization work in the Lower South Santiam River.

Conclusion

The width to depth ratio in the Lower South Santiam River is significantly greater than PFC conditions, and upstream dams, shoreline stabilization projects and human development in riparian areas have constrained channel dynamics. Thus, NOAA Fisheries rates channel geomorphology and morphometry as NPF.

4.3.5.2 Streambank Condition

Status Relative to Properly Functioning Condition

In this lower river setting, NOAA Fisheries defines PFC as less than 10 % of streambanks actively eroding. Further, PFC includes streambanks that are well vegetated, providing cover and complex habitat.

The South Santiam River has been identified as having slope, bank, and channel erosion problems causing sedimentation and turbidity (SSWC 2000). In addition, at least 35 % of the Lower South Santiam River has been stabilized by revetments (Corps 1989). As a result, a significant portion of the streambanks do not support mature riparian vegetation and provide insufficient cover habitat.

Conclusion

The streambank condition of the Lower South Santiam River is degraded due to eroding banks and extensive revetments. NOAA Fisheries rates this habitat indicator as NPF.

4.3.5.3 Floodplain Connectivity

Status Relative to Properly Functioning Condition

NOAA Fisheries defines PFC as well-connected, off-channel areas with overbank flows of sufficient frequency to maintain function.

Reductions in the magnitude and frequency of high flow events by flood control operations at Green Peter and Foster Dams have reduced connectivity of off-channel areas to the main channel of the South Santiam River by substantially reducing the magnitude of the channel-forming dominant discharge (i.e., the 1.5- to two-year flood) and greatly extending the return intervals of larger floods (Corps 2000). Bank stabilization measures and human development in riparian areas have also disconnected off-channel and wetland areas from the main channel (SSWC 2000). Thus, floodplain connectivity within the action area is extensively limited by these operations and measures.

Conclusion

Floodplain connectivity within the action area is extensively limited as a result of flood control operations, bank stabilization measures, and human development in riparian areas. NOAA Fisheries rates this indicator as NPF.

4.3.6 Flow and Hydrology

4.3.6.1 Altered Flows-Flow Fluctuations

Status Relative to Properly Functioning Condition

NOAA Fisheries defines properly functioning flow fluctuations as those that are gradual enough to allow normal behavioral adjustments to prevent stranding of fish and to avoid dewatering of redds.

The South Santiam River downstream from Foster Dam is subject to rapid water level fluctuations, particularly during active flood control operations when discharge may be sharply decreased to prevent downstream flooding. At Foster Dam the maximum allowable downramping rate is 30% of discharge per half-hour (Corps 2000). Upramping rates vary from 500 cfs per hour at initial flows between 500 and 1,000 cfs, to 2,500 cfs per hour when initial flows are higher than 18,000 cfs.

Juvenile salmonids may be entrapped and stranded downstream from Foster Dam when discharge is reduced precipitously during winter flood events. Rapid downramping after a period of high flows can also dewater redds, causing mortality of eggs and alevins (Hunter 1992). This potential is most pronounced immediately downstream of Foster Dam and diminishes in a downstream direction as unregulated tributaries enter the river. The effect of rapid flow fluctuations on juvenile rearing and adult spawning habitat in the action area is dampened because of its distance downstream from Foster Dam.

The existing effects of canal diversions on flow fluctuations in the action area can be derived from existing information. The City presently diverts up to 120 cfs for nonpower uses and has no restrictions on start-up and shutdown rates (FERC 1998b). The worst case scenario for ramping of the South Santiam River below the dam would occur when the City changes its diversion rate from no operation to full diversion, and vice versa, during low flow periods. Based on flow duration curves for the period, 1966 through 1991, a 23-year period representing regulated flows in the South Santiam River, 95 % of the time at the Waterloo Gage (2.5 miles upstream of the dam), flows equaled or exceeded 425 cfs in June, July and August, the lowest flow months (City of Albany 1994b). Thus, an unlikely worst case ramping condition would be for the City to nearly instantaneously start-up or shutdown its diversion during low flow periods, resulting in river flows increasing to 545 cfs or decreasing to 305, a 28 % change in flow rate. Based on USGS stage versus discharge data for the South Santiam at Waterloo gage, 14187500, this change in flow would correspond to a stage change of about 0.13 ft, or about 2 inches (USGS 2004). When river flows are higher, a sudden start-up or shutdown of the canal would likely result in a lower change in river stage.

Fish stranding and redd dewatering effects in the action area have not been investigated with respect to existing diversion rates at the canal. However, Hunter (1992) concludes that ramping that does not exceed 2 inches per hour is likely to protect most salmonid fry. During an emergency shutdown at the canal, flow fluctuations could exceed this rate because the gates could be closed in a few minutes rather than over an hour-long period. Thus, existing emergency canal shutdown may create adverse stranding and redd dewatering conditions in the action area.

Conclusion

Flow fluctuation in the action area is likely affected by both existing operation of the canal for nonpower water use and operation of the Corps' Foster and Green Peter Dams in the upper basin. For these reasons, NOAA Fisheries rates this indicator as NPF.

4.3.6.2 Seasonal High and Low Flows

Status Relative to Properly Functioning Condition

NOAA Fisheries defines PFC for the watershed hydrograph as similar in terms of peak flow, base flow, and timing characteristics to the pre-development condition in the action area or an undisturbed watershed of similar size, geography, and geology. Flows must be adequate to maintain temperatures within recommended criteria. Pronounced changes to the hydrograph or significant disruptions in flow that prevent passage of anadromous fish are classified as NPF. Anadromous salmonids are very sensitive to changes in streamflow and time their life-cycle movements according to local discharge regimes.

Flood control operations at the Corps' Foster and Green Peter Dams have substantially decreased the frequency and magnitude of high flow events in the Lower South Santiam River (Corps 2000). High flows at the Waterloo gage have decreased, from a highest recorded flow of 95,200 cfs in December 1964 (USGS 1997), to 29,300 cfs since construction of the Corps' dams in the late 1960's (Corps 2000).

Low flows are a natural occurrence in the South Santiam River and its tributaries, but the severity, timing, and frequency of low flows have been altered by Green Peter and Foster project operations. Refill operations at these reservoirs have reduced flows in the Lower South Santiam River during late winter and spring months. Operation of Green Peter and Foster Dams has reduced average daily April flows at Waterloo by 23% (Corps 2000). On the other hand, the Corps' projects have increased summer low flows over pre-dam conditions. During summer and early fall, the average daily flow in August before the Corps' dams were constructed was 261 cfs (USGS 1990). Since dam construction, the average daily flow in August has increased to 816 cfs (USGS 1990) because the Corps releases water in the year for flow augmentation and pollution abatement purposes (Corps 2000).

Water is diverted from the South Santiam River and its tributaries for agricultural, municipal, industrial, and hydroelectric power uses (SSWC 2000). Although these water diversions exacerbate natural low flow conditions in the tributaries during summer and early fall, the effects of consumptive water diversions in the South Santiam are overshadowed by the mitigating influence of the Corps' flow releases from Foster and Green Peter Dams (SSWC 2000).

The canal is the largest water diversion in the South Santiam River below the Corps' dams. Since 1870, the canal has diverted from 25 to 200 cfs from the South Santiam River at the dam, with much of the water used consumptively (FERC 1998b). "Excess" flows of 3 to 8 cfs return to the South Santiam at the mouth of Hospital and Mark Sloughs, at RM 15.4 and 16.7, respectively, and the remainder of return flow is discharged into the Calapooia River just upstream of its confluence with the Willamette River, near Albany (*ibid*).

Conclusion

The Corps' upstream dams have caused significant hydrologic changes in the Lower South Santiam River compared to undisturbed conditions. While decreased peak flows hamper natural channel forming processes, resulting in less complex fish habitat, higher summer flows likely provide better fish holding and passage conditions during drought years. In the action area, the canal diverts a large proportion of river flow during low flow periods, although its effects are partly masked by stored water released from the Corps' upstream dams. NOAA Fisheries rates this indicator as NPF with respect to high flows and AR for low flows.

4.3.7 Watershed Condition

4.3.7.1 Increase in Drainage Network

Status Relative to Properly Functioning Condition

NOAA Fisheries defines PFC as zero increases in drainage network due to roads. That is, the construction of roads and their companion drainage systems have not increased the total number of drainage routes to the river (potentially increasing input of sediment and contaminants). Watersheds that are considered AR exhibit moderate increases in drainage network density (e.g., 5 %), and those defined as NPF have drainage systems significantly affected by increased road density, in the range of 20 % or more.

As stated in section 4.2.7.2, road densities in the Lower South Santiam River Basin are estimated at less than 1 % to nearly 4 % of total watershed area (SSWC 2000).

Conclusion

Because of moderate road densities in the Lower South Santiam River Basin, NOAA Fisheries rates this indicator as AR.

4.3.7.2 Road Density and Location

Status Relative to Properly Functioning Condition

NOAA Fisheries defines PFC as <2 miles of road per square mile with no valley bottom roads. Watersheds with road densities of 2 to 3 miles per square mile with some valley bottom roads are rated AR, and those with road densities >3 miles per square mile with many valley bottom roads are considered NPF.

An assessment of forestry roads in the Lower South Santiam River Basin, including 14 tributaries and the mainstem South Santiam River below Foster Dam, estimated an average of 5.3 miles per square mile of watershed area. For the mainstem South Santiam River alone, forestry roads averaged just less than 3 miles per square mile (SSWC 2000). These estimates do not include rural, residential, and urban roads, which are extensive in the lower basin, including in valley bottom areas.

Conclusion

Road density in the Lower South Santiam River Basin exceeds 3 miles per square mile. For this reason, NOAA Fisheries rates this indicator as NPF.

4.3.7.3 Disturbance History

Status Relative to Properly Functioning Condition

The surrounding watershed profoundly influences the physical and biological processes that occur in a stream. Disturbances in the watershed associated with logging or development can lead to increased sediment input, increased water temperatures, and other habitat degradation which directly affect listed salmonids. NOAA Fisheries defines PFC for disturbance history as having <15 % equivalent clear-cut area (entire watershed) with no concentration of disturbance in unstable or potentially unstable areas, and/or refugia, and/or riparian area; and for Northwest Forest Plan area (except adaptive management areas), 15 % retention of late successional old growth timber in the watershed.

Since the early 1900s, agricultural practices and urban and rural development have modified the bottomland forests, wetlands, prairies and mixed conifer hardwood forests of the Lower South Santiam watershed (PNERC 2002). While the lower 20 % of the South Santiam watershed is comprised of a floodplain dominated by grass seed farming and other agriculture, pastureland, and urban and rural development, much of the heavily forested, higher elevation lands are owned and managed by the U.S. Forest Service (USFS) and the Bureau of Land Management (SSWC 2000). Disturbances in the upper basin are primarily associated with forestry, roads and gravel mining (SSWC 2000).

Conclusion

Because of extensive conversion of low elevation lands to agriculture and other development, and ongoing forestry practices in upper basin lands, NOAA Fisheries rates this indicator as NPF.

4.3.7.4 Riparian Reserves

Status Relative to Properly Functioning Condition

NOAA Fisheries defines PFC as a riparian reserve system which provides adequate shade, LWD recruitment, habitat protection, and connectivity to all subwatersheds. This reserve must be greater than 80 % intact and the vegetation must be 50 % similar to the potential natural community composition.

The South Santiam Watershed Assessment (SSWC 2000) quantified riparian health in terms of a riparian area's buffer width and continuity, and its ability to recruit large wood. Stream shading was not quantitatively assessed; however, it was considered a contributing factor to increased stream temperatures. In the Lower South Santiam subwatershed, 12 % of the buffer width was rated as "poor," 58 % as "fair," and 30 % as "good." Continuity of riparian zones in the Lower South Santiam River was classified as "poor" for about 50 % of its length.

The future potential to recruit large wood was considered "high" in approximately half of the Lower South Santiam subwatershed (SSWC 2000). However, this assessment focused on the tributaries, included trees as young as 40-years in its definition of "large wood," and did not consider the interception of large wood supply from the upper basin by the Corps' Foster and Green Peter Dams.

Conclusion

The Lower South Santiam River in the action area is characterized by narrow, discontinuous riparian zones, and has decreased potential to recruit large wood due to interception at upstream dams. For these reasons, NOAA Fisheries rates this indicator as NPF.

4.4 Summary of Biological Requirements Under the Environmental Baseline

Many of the habitat biological requirements of the South Santiam River populations of the UWR chinook salmon ESU and UWR steelhead ESU are not being met under the environmental baseline. Environmental baseline conditions in the action area would have to improve to meet those biological requirements not presently met. Any further degradation or delay in improving these conditions might increase the amount of risk the listed ESUs presently face under the environmental baseline. Table 4-4 displays a summary of the relevant factors discussed in this section, based on the Matrix of Pathways and Indicators described in NOAA Fisheries (1996).

Habitat conditions directly affect the survival and fecundity of individual salmon, which in turn affects the viability of a particular population of salmonids. The habitat method was developed to describe and analyze habitat changes from a PFC (most beneficial for salmonids) and by inference, the effects of these changes on salmonid populations.

Table 4- 3 Matrix of Pathways and Indicators for assessing the environmental baseline. Unless otherwise noted, the descriptions apply to the habitat biological requirements of the populations of both listed ESUs found in the action area. Function codes include: PFC-properly functioning condition, NPF-not properly functioning, and AR-at risk.[3]

Pathway	Indicator	Baseline Condition	Condition Description	Cause of Baseline Condition
Water Quality	Contaminants /Nutrients	PFC	Criteria for pH were attained in both mainstem Santiam and South Santiam during 10-year monitoring period; Not designated on DEQ 1998 or 2002 303(d) lists.	Natural conditions.
	Temperature	NPF	Exceedences of spawning and rearing temperature criteria in past; DEQ 2002 303(d) list.	Unknown relative effects due to low flow in bypass reach, Corps reservoir operations, irrigation effects and natural conditions.
	Dissolved Oxygen	AR	Exceedences of DO criteria for spawning documented during 10-year monitoring period in the mainstem Santiam River, but infrequent exceedences in the action area of the South Santiam River.	Unknown relative effects of nonpoint and point source pollutants, warmer temperatures, and natural conditions.

[3]For some indicators, activities or conditions outside of the action area (e.g., in the Upper South Santiam River) have effects that translate downstream and impact habitat conditions within the action area. NOAA Fisheries describes these activities and conditions to fully convey the cause of the baseline condition.

Table 4-3, Continued

Pathway	Indicator	Baseline Condition	Condition Description	Cause of Baseline Condition
	Sediment/ Turbidity	AR	High turbidity associated with high flows, mass wasting and channel erosion problems, but not designated as a concern by DEQ.	Corps dams upstream reduce natural sediment transport; forestry and agricultural practices, road construction, and municipal runoff in the lower basin increase sediments and turbidity.
Habitat Access	Fish Passage	NPF	Upstream and downstream passage conditions impaired at Lebanon Dam in the South Santiam.	Inadequate fish ladders at Lebanon Dam and unscreened canal intake.
Habitat Elements	Substrate	AR	Substrate affected by impaired sediment transport from the upper basin; gravel bar formation impaired by channel simplification and lack of large wood.	Upstream Corps dams intercept sediment and large wood, and land use practices, including revetments and channelization in lower river.
	Large Wood	NPF	Large wood density in Lower South Santiam and mainstem Santiam rivers is low.	Upstream Corps dams intercept large wood; land use practices have reduced amounts of riparian forests; large wood was removed from channel in past for navigation, recreation and fish passage.
	Off-Channel Habitat	NPF	Few or no secondary channels and backwaters in Lower South Santiam River; historic oxbows and bends disconnected from main channel.	Riprap and revetments restrict access to historic off-channel habitat.
	Pool Frequency/ Quality	AR	Pools frequent and deep but lacking adequate large wood recruitment to provide cover.	Upstream dams intercept large wood; other land practices reduce available large wood; and large wood removed in past for navigation, recreation and fish passage.
	Refugia	NPF	Refugia habitats exist, but are insufficient in size and number, and are not adequately buffered.	Constrained channel by revetments, restricting availability of refugia.

Table 4-3, Continued

Pathway	Indicator	Baseline Condition	Condition Description	Cause of Baseline Condition
Channel Dynamics	Channel Morphology	NPF	Width to depth ratio in the action area is significantly greater than PFC conditions; channel dynamics constrained.	Upstream dams, shoreline stabilization projects and human development in riparian areas inhibit channel-forming processes.
	Streambank Condition	NPF	Streambanks do not support natural floodplain function in the lower river.	Human development in riparian areas, natural conditions, and revetments.
	Floodplain Connectivity	NPF	Floodplain connectivity constrained in action area, and overbank flows are reduced.	Flood control operations, bank stabilization measures, and human development in riparian areas.
Flow/ Hydrology	Flow Fluctuations	AR	Rapid flow fluctuations may exceed 2 in per hour in the action area, potentially stranding juvenile fish and dewatering redds.	Operations at Foster and Green Peter Dams on the South Santiam River cause rapid flow changes downstream; rapid changes in diversion rates at the Santiam-Albany Canal.
	Seasonal Flows-Low	AR	Summer and fall low flows Lower South Santiam River are not as low as historically, resulting in both positive and negative habitat effects.	Corps' Foster and Green Peter reservoirs release stored water to augment natural low flows.
	Seasonal Flows-High	NPF	Peak flows in lower river decreased from historic peak flows, altering channel forming processes.	Corps' Foster and Green Peter reservoirs moderate flood flows.
Watershed Conditions	Increase in Drainage Network	NPF	Road density has likely contributed to increased peak flows.	Forestry, agricultural and urban roads.
	Road Density and Location	NPF	Large network of forestry, agricultural, and urban roads in Lower South Santiam River watershed.	Logging, and agricultural, industrial, and urban development.
	Disturbance History	NPF	Extensive alteration of natural landscape, loss of bottom forest, wetlands, and riparian habitat.	Logging, and agricultural and urban and rural development.
	Riparian Reserves	NPF	Narrow, discontinuous riparian areas, decreased potential to recruit large wood.	Agricultural and urban and rural development in Lower South Santiam River, and the Corps' Foster and Green Peter Dams in the upper basin.

The relationships of the habitat effects to effects on salmonids and their populations are described in Table 4-4. The effect on populations is described in terms of the VSP criteria from McElhaney et al. (2000). The VSP criteria encompass abundance, population productivity trends, spatial distribution, and diversity. In the absence of minimum viable population size estimates, and often accurate data on actual population sizes, NOAA Fisheries uses these attributes to assess the effects of the habitat indicators on the viability of a salmonid population.

Table 4-4

Effects of baseline habitat condition indicators on population viability attributes.			
Indicator	**Life Stages Affected**	**Effect**	**Population Viability Attributes Affected**
Passage/Access to Historical Habitat	Adult, juvenile, smolt	• Poor upstream passage delays access to spawning habitat. • Poor downstream passage causes direct and delayed mortality of smolts and juveniles.	• Adult abundance and productivity • Juvenile outmigrant growth rate • Spatial structure
Flow and Hydrology-Low Seasonal flows	Adult, incubating eggs, juvenile, smolt	• Reduce rearing habitat • Inhibit upstream and downstream passage • Increase water temperatures.	• Adult abundance and productivity • Juvenile outmigrant growth rate • Spatial structure
Habitat Elements, Channel Dynamics, Watershed condition	Adult, incubating eggs, juvenile, smolt	• Degrade spawning and rearing habitat.	• Adult abundance and productivity • Juvenile outmigrant growth rate • Spatial structure
Water Quality	Adult, juvenile, incubating eggs	• Degrade spawning and rearing habitat • Exceedences contribute to direct or delayed mortality.	• Adult abundance and productivity • Juvenile outmigrant growth rate • Spatial structure

5. ANALYSIS OF EFFECTS OF THE PROPOSED ACTION

5.1 Effects of the Proposed Action

Effects of the action are defined as "the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with the action, that will be added to the environmental baseline" (50 CFR §402.02). Direct effects occur at the construction site and may extend upstream or downstream based on the potential for impairing important habitat elements. In this Opinion, NOAA Fisheries distinguishes the immediate, direct effects of the proposed construction activities from long-term, direct effects. Long-term, direct effects are those which result from operation of the newly constructed facilities for previously authorized uses.

Indirect effects are defined in 50 CFR §402.02 as "those that are caused by the proposed action and are later in time, but still are reasonably certain to occur." They include the effects on listed species of future activities that are induced by the proposed action and that occur after the action is completed. "Interrelated actions are those that are part of a larger action and depend on the larger action for their justification" (50 CFR §403.02). "Interdependent actions are those that have no independent utility apart from the action under consideration" (50 CFR §402.02). Future Federal actions that are not a direct effect of the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not considered in this Opinion. Operation of the City's hydroelectric facilities following completion of the construction activities is neither evaluated as an indirect effect nor an interrelated or interdependent action, because this is a separate Federal action that has not yet been the subject of ESA consultation. NOAA Fisheries does not expect other indirect effects or interrelated or interdependent actions to occur as a result of the proposed action.

5.2 Methods of Analysis

In step 3 of its jeopardy analysis, NOAA Fisheries evaluates the effects of proposed actions on listed salmon and steelhead in the context of their biological requirements, as described in sections 3 and 4.

NOAA Fisheries may use either or both of two independent techniques in determining whether the proposed action jeopardizes a species' continued existence. First, NOAA Fisheries may consider the impact in terms of how many listed salmon will be killed or injured during a particular life stage, and then gauge the effects of that take on population size and viability. Alternatively, NOAA Fisheries may consider the effect on the species freshwater habitat requirements, such as water temperature, stream flow, etc. The habitat approach is based on the well-documented cause and effect relationships between habitat quality and population viability. While the habitat approach to the jeopardy analysis does not quantify the number of fish adversely affected by habitat alteration, it considers this connection between habitat and fish populations by evaluating existing habitat condition in light of habitat conditions and functions known to be conducive to salmon conservation (Spence et al. 1996). In other words, it analyzes

the effect of the action on habitat functions that are important to meet salmonid life cycle needs. The habitat approach then links any failure to provide habitat function to an effect on the population and to the ESU as a whole. In this consultation, NOAA Fisheries uses the habitat approach in considering the biological requirements best described by important habitat characteristics. The effects are summarized with respect to whether they impair properly functioning habitat ("impair"); appreciably reduce the functioning of already impaired habitat ("reduce"); retard the long-term progress of the impaired habitat toward PFC ("retard"); or not reduce, retard, or impair ("NR") (NOAA Fisheries 1999).

5.3 Immediate Effects of Construction Activities

Potential immediate construction related effects to UWR chinook salmon and UWR steelhead include direct and indirect harm to fish associated with the following actions and potential events: 1) dewatering of the area behind the cofferdams; 2) leaking or spill of chemical contaminants or hazardous material (gasoline, oil, grease, concrete) into the river; 3) increasing suspended sediment and turbidity from the in-river construction work or stormwater runoff from construction sites; 4) restricting or delaying fish passage; and 5) removing riparian habitat. Potential effects include fish injury, stress, or mortality associated with salvage operations behind cofferdams, direct injury and mortality due to concentrated hazardous spill events, behavioral changes from elevated contaminant and turbidity levels, stress associated with upstream passage delays, and decreased habitat carrying capacity caused by loss of rearing and holding habitats.

These potential effects are addressed below and considered in relation to the pathways and indicators used for assessing the environmental baseline in section 4.

5.3.1 Isolating the In-Water Work Area

As described in section 2.3.1.9, the Corps would require the City to isolate the work area upstream and downstream of the dam so that the left and right bank fishways and dam reconstruction work can be done in a dewatered area. Although isolation of the work area is, in itself, a conservation measure to reduce the adverse effects of erosion and runoff on aquatic organisms, any individual fish present in the isolation area could be injured, killed, or stressed during capture and release activities.

During construction activities, the Corps would require the City to follow a fish capture and release program, described in section 2.3.1.10, which will comply with NOAA Fisheries' guidelines for safe fish salvage/capture and release practices as described in SLOPES II (NOAA Fisheries 2003a). By following these guidelines, the City should avoid lethal take and injury associated with fish capture and release. Although direct harm is possible during in-water work, fish will vacate the immediate area when equipment enters the water.

Capturing and handling fish causes stress, although they typically recover rapidly from the process, so the overall effects are generally short-lived (NOAA Fisheries 2003a). The primary contributing factors to stress and death from handling are differences in water temperatures (between the river and wherever the fish are held), DO conditions, the amount of time fish are held out of water, and direct physical trauma. Stress on salmonids increases rapidly if the water temperature exceeds 18^{o} C or if DO is low.

The proposed fish capture and release program, described in section 2.3.1.10, will comply with NOAA Fisheries' guidelines for safe fish salvage/capture and release practices as described in SLOPES II (NOAA Fisheries 2003a). This will reduce the magnitude and duration of handling-induced stress on the small number of ESA-listed salmonids likely to be affected by this single dewatering event.

5.3.2 Water Quality Contaminants

Construction activities at the dam and the canal intake will require the use of heavy equipment in close proximity to the South Santiam River. Use of heavy equipment near a water body introduces the risk that toxic contaminants (e.g., fuel, oil, etc.) could enter the river. Chemical contaminants can be introduced into waterbodies through direct contact with contaminated surfaces or by the introduction of storm or washwater runoff and can remain in solution in the water column or deposit on the existing bed material. Research has shown that exposure to contaminants reduces reproductive capacity, growth rates, and resistance to disease, and may lead to lower survival for salmon (Arkoosh 1998a and 1998b). In addition to these effects, a concentrated spill of hazardous materials into the river could result in direct fish losses.

The Corps would require the City to reduce the likelihood of these immediate, direct effects by implementing best management practices as described in the ESCP and PCP, and as summarized in sections 2.3.4.1 and 2.3.4.2. Specific measures to minimize the risk of contaminants entering the water include:

1. No fueling of equipment will be permitted within 50 ft of the South Santiam River or the Santiam-Albany Canal;

2. Vehicles will be examined daily for fluid leaks during periods when operated within 300 ft of the two-year floodplain;

3. At the end of each work shift, vehicles will be stored more than 300 ft (horizontal distance) from the two-year flood elevation or in an area approved by the City's construction manager.

4. Before operating within the two-year floodplain, all equipment will be cleaned of external oil, grease, dirt, or caked mud. Any washing of equipment will be conducted more than 300 ft from the two-year flood elevation and in a location that will not contribute untreated wastewater to any flowing stream.

5. No "green" or uncured concrete or water having had contact with newly poured concrete will come in contact with flowing water or be disposed of within wetlands or the two-year floodplain.

Although it is possible that chemical contaminants could leak into the South Santiam River during construction activities, the Corps' requirement that the City use best management practices described herein and in the ESCP and PCP will substantially reduce this risk. In the unlikely event that contaminants do leak into the South Santiam River, they would be diluted quickly and would be expected to cause only short-term impairment of water quality conditions.

5.3.3 Water Quality Temperature and Dissolved Oxygen

During the construction period, the City will continue to divert water for non-hydropower purposes to serve water users along the canal. River flow will not be measurably changed from the existing flow regime. Construction activities will not cause increased organic pollution to enter the river, potentially altering DO levels. No construction-related changes in temperature or DO are expected during the construction period.

5.3.4 Water Quality Sediment/Turbidity

Construction activities at the dam and the canal intake may temporarily introduce sediment to the Lower South Santiam River. Specifically, cofferdam construction and removal, bank stabilization and bank revegetation may temporarily increase suspended sediment and turbidity and redistribute sediments. Although no direct fish mortality would be expected from temporary increases in suspended sediment and turbidity, juvenile and adult fish may exhibit behavioral changes (Sigler et al. 1984; Berg and Northcote 1985).

To reduce sediment related adverse effects on listed salmonids and their habitat, the Corps would require the City to follow the ESCP (City of Albany 2004b). The intent of this plan is to describe proactive practices that must be taken to prevent erosion, releases of sediment, and other pollutants generated at ground disturbance sites. The details of this plan would be completed by the City's contractor before beginning any in-water construction activities.

In its ESCP, the City has specified that cofferdams be constructed using one of the following methods: Portadam structure, Ecology blocks or sandbags and plastic sheeting. Compared to traditional, rock and gravel cofferdams, these methods significantly reduce the amount and duration of turbidity and sediment input to the stream. Installation and removal could be expected to cause only minimal disruption of bottom sediments and resultant increases in turbidity and suspended sediments in the local area.

The Corps would require the City to control erosion and sedimentation by scheduling most construction activities to take place during the dry season to avoid the potential for erosion from stormwater runoff. The only construction activity that is likely to take place during winter months is screen construction and canal work in the dewatered intake canal. This work, including cofferdam installation, will take place entirely within the intake canal, and therefore is not considered "in-water" work. Further, NOAA Fisheries requested the City to schedule this work for the Winter, 2005, in order to achieve fish protection at the intake as soon as possible, and preferably prior to the Spring, 2005, juvenile fish outmigration period (CH2M HILL 2004b). This construction activity during winter months may increase the likelihood of stormwater runoff, although background turbidity during high flow events will probably moderate or mask any construction-related increase in turbidity.

The Corps would require the City to conduct all in-water work during the designated in-water work window of June 1 through August 31. This window was designed to minimize exposure of anadromous salmonids to indirect effects of increased turbidity and suspended sediment by allowing work during periods of limited or nonmigratory times for anadromous salmonids. The only potential migrating salmonid species in the system would be summer steelhead, which is not endemic to the Upper Willamette River and is not a listed or proposed species. Although the Lower South Santiam River is used as rearing habitat and adult holding habitat for UWR chinook salmon and UWR steelhead, the in-water work period is the time of year when these populations are least likely to inhabit the construction area.

NOAA Fisheries expects that implementation of the ESCP will reduce the likelihood of large scale sediment input and will result in only a short-term increase during the construction period of turbidity and suspended sediment below the dam.

5.3.5 Habitat Access Fish Passage and Access to Habitat

As noted above, in 4.2.3, upstream fish passage is inadequate at the existing ladders at the dam, and downstream migrating fish are entrained at the existing unscreened canal intake. The modifications proposed to the right bank fishway, closure of the center fishways, installation of the crest gate, and reconstruction of the left bank fishway will greatly enhance the long-term passage conditions for upstream migration of UWR chinook salmon and UWR steelhead. Additionally, the proposed construction of a canal intake screen designed to meet NOAA Fisheries' criteria will essentially eliminate fish entrainment and result in improved downstream fish passage. However, there is the potential for temporary delay of upstream fish passage during construction activities at the dam.

The Corps would require the City to work in stages to ensure efficient completion of discrete facilities and to reduce the likelihood of fish passage delays (Corps 2004). In Stage I, the Corps would require the City to complete site preparation activities, all located off-stream, such as site clearing, construction of staging areas, sedimentation ponds, access roads and stockpile areas. This stage does not pose any concerns regarding fish passage.

Stage II will involve screen construction, dredging near the screen to ensure adequate flow capacity, and construction of a bypass pipe to return fish to the river below the dam. This work, located off the main stream channel, will not affect upstream fish passage. The Corps proposes that the City conduct Stage II work during Winter, 2005, in order to achieve fish protection at the intake as soon as possible, and preferably prior to the Spring, 2005 juvenile fish outmigration period. Because Stage II work will occur outside of juvenile downstream fish passage period and within the intake canal, NOAA Fisheries does not expect any delay or adverse effects to downstream fish passage during construction.

Temporary upstream fish passage effects would most likely be associated with Stage III activities. Stage III will consist of cofferdam construction, replacement of the left bank fishway, modification of the right bank fishway, closure and removal of the two center fishways, and installation of a crest gate (consisting of a two-part inflatable dam) on the dam. The Corps proposes that the City conduct these activities over a two-year period to ensure at least one existing fishway is operable at all times.

The left bank fishway will be constructed during the first in-water construction period in 2005, during which time the existing right bank fishway will remain operational. This period coincides with the lowest rate of upstream fish passage in the Lower South Santiam River for both UWR spring chinook and UWR steelhead. Additionally, following discussions with NOAA Fisheries, USFWS, and ODFW, the City agreed to install a temporary denil fishway adjacent to the left bank cofferdam during construction of the left bank fishway (CH2M HILL 2004c). Because the primary attraction flow at the base of the dam draws fish toward the left bank, the agencies agreed that this additional fish passageway would provide another upstream fish passage option in the event fish avoided the existing right bank fishway. NOAA Fisheries expects some minor delays in upstream migration during periods of transition between passage paths. However, these delays are not expected to prevent timely upstream passage and spawning.

The right bank fishway will be shut down and modified during the in-water work period of the second year of construction (2006). During this period, the new, left bank fishway will be operational. NOAA Fisheries expects that lack of passage at the right bank will be offset by much improved passage at the left bank.

In summary, NOAA Fisheries expects some minor, short-term delays in upstream fish passage during reconstruction of the left bank fishway.

5.3.6 Habitat Element Substrate

As discussed above in section 5.3.4, cofferdam construction and removal and bank stabilization and revegetation are activities that may temporarily increase suspended sediments in the Lower South Santiam River. Suspended sediment has the potential to settle out on top of existing substrate further downstream, possibly affecting the quality of spawning and rearing habitat. Fine suspended sediment typically settles out in areas of lowest velocity, such as pockets, backwaters and pools. Because chinook salmon spawn in water with velocities between 30 and

91 cm/second (Bjornn and Reiser 1991), it is unlikely that spawning areas will experience any significant sedimentation. Moreover, although fall chinook salmon are known to spawn in reaches below the dam, there are no documented reports of UWR spring chinook or UWR steelhead spawning in the Lower South Santiam River (SSWC 2002, ODFW 1992). High winter flows will likely disperse fine sediments that settle out during summer low-flow periods. Due to the limited duration and magnitude of suspended sediment expected to be mobilized during construction activities, and because the Corps would require the City to follow its ESCP to reduce the likelihood of materials entering the river, any downstream accumulations of fine sediment are expected to have only short-term effects on bed material composition.

NOAA Fisheries expects that construction activities will result in limited, short-term increases in small sediments that may temporarily settle out on existing substrate. However, high winter flows are expected to re-suspend fine sediments, such that construction activities will only have an immediate effect of short duration on this habitat indicator.

5.3.7 Other Habitat Elements

Construction activities will have no direct or indirect effects on other habitat elements, including large wood, off-channel habitat, pool frequency and quality and refugia in the action area.

5.3.8 Channel Dynamics – Channel Morphology and Floodplain Connectivity

As noted above in sections 4.2.5.1 and 4.2.5.3, channel dynamics and floodplain connectivity in the action area are primarily constrained by upstream dams and bank stabilization projects that inhibit natural channel forming processes. The cofferdams that will be in place during construction will alter channel hydraulics in the immediate areas above and below the dam but are not likely to cause short or long-term changes in channel morphology and floodplain connectivity. For this reason, NOAA Fisheries expects no effect of construction activities on these indicators.

5.3.9 Channel Dynamics – Streambank Condition

During construction, ground disturbance that will alter streambank condition will occur in Stages I, II, and III. Ground disturbance in Stage I will be limited to the creation of access roads, stockpile areas, and staging areas. Staging areas for right bank and left bank construction activities will be located in upland areas outside the ordinary high water mark of the South Santiam River. Stage II ground disturbance will occur during the construction of the fish bypass pipe. Stage III ground disturbance will occur during cofferdam construction. Both Stage II and III ground disturbance will take place in and adjacent to the streambank.

Ground disturbance will include the removal of riparian vegetation, including grasses, shrubs, and trees. Vegetation disturbed by construction will be reestablished by hydro seeding and subsequently maintained in all areas except for roadways and rocked areas. The City will replant all disturbed areas with native woody and herbaceous vegetation at the conclusion of construction.

Thus, although there will be negative effects to riparian vegetation associated with construction activities, these effects will be short term. As described above in section 4.2.5.2, existing streambank condition of the Lower South Santiam River is degraded due to eroding banks and extensive revetments. NOAA Fisheries expects that temporary removal of riparian habitat will retard progress toward properly functioning conditions, but that re-planted riparian vegetation will replace the affected area within 5 to 15 years.

5.3.10 Flow and Hydrology

During construction, the City will continue to divert up to 120 cfs for nonpower uses and will install a temporary bypass pipe around the area of the canal intake during screen construction. As described in section 4.2.6, existing streamflows are dominated by the Corps' operation of the large, upstream Green Peter and Foster Dams. River flows and fluctuations will not be affected by construction activities.[4]

5.3.11 Watershed Conditions

Construction activities will temporarily create additional disturbance of the riparian habitat in the immediate area, but will not appreciably alter the baseline drainage network or road density. As described above in section 5.3.7, ground disturbance in Stages II and III will include removal of riparian vegetation, including grasses, shrubs, and trees. The Corps would require the City to replant all disturbed areas with native woody and herbaceous vegetation at the conclusion of construction. However, it will take at least five-years for replanted vegetation to provide similar habitat value to that will be removed. The Corps would require the City to monitor these areas for the first five-years after construction and will maintain these areas to ensure that riparian habitat is successfully restored.

Because existing riparian habitat in the immediate area will be temporarily affected by the proposed action, NOAA Fisheries expects that construction activities will retard progress toward properly functioning conditions. This effect is short-term, however, because successful reestablishment of riparian habitat is expected within 5 to 15 years after construction is completed.

[4] The effects of additional flow diversions for hydropower purposes and minimum streamflow that are required by the FERC license for the hydroelectric project are not considered in this analysis because FERC's action, which has not yet undergone Section 7(a)(2) consultation, is separate from the construction activities that the Corps is authorized to permit.

5.3.12 Summary of Immediate Effects of Construction Activities

The proposed construction activities at the dam and the canal may directly affect UWR spring chinook and UWR steelhead by isolating them behind cofferdams and by temporarily delaying upstream fish passage during fishway construction. The City's proposed plans to salvage any fish stranded behind cofferdams will limit effects of handling induced stress. The City's plans to install a denil fishway during construction of a new left bank fishway will limit potential upstream fish passage delay.

Construction activities will temporarily reduce the status of several habitat characteristics relative to properly functioning condition. However, most of these effects will be short-term in nature, and cease when construction is complete. The only effect that will have a longer term effect is the removal of riparian vegetation because it will take a number of years for newly replanted vegetation to replace the quality of habitat that will be removed. Construction activities will not reduce, retard, or impair other habitat characteristics. These immediate effects of the proposed action, as well as the long-term effects described in section 5.4, are summarized in Table 5-1.

5.4 Long-Term Effects of Construction Activities

In this Opinion, the immediate effects of construction activities are described in section 5.3. This section considers long-term effects resulting from the existence and operation of the facilities after construction is completed. Potential effects could include direct fish mortality or injury at the new intake screen and fishways if they are not operated or maintained properly. Habitat effects could include alteration of channel morphology associated with permanent loss of instream habitat.

As discussed above, future operations related to the diversion of water for hydroelectric power purposes are not considered as part of this Opinion, because the proposed action is limited to the authorization by the Corps for the above-described construction activities. Operations for hydroelectric power generation are not within the jurisdiction of the action agency, and as mentioned above, FERC has thus far not consulted with NOAA Fisheries on the effects of issuing the FERC license.

Unlike the approach taken in section 5.3, where potential construction-related effects were examined with respect to each habitat pathway and indicator, this section only focuses on those indicators that have the potential to be affected by the operation and existence of the new and rebuilt facilities. These long-term effects are summarized in Table 5.1, which distinguishes immediate construction-related effects from long-term effects of operation and maintenance of the new and rebuilt facilities.

5.4.1 Habitat Element - Fish Passage and Access to Habitat

For nearly 80-years, the dam has been a full or partial barrier to upstream fish migration in the South Santiam River. Reconstruction of the fishways at the dam and replacement of the dam's flashboards with an adjustable crest gate will substantially improve passage conditions in the Lower South Santiam River.

Juvenile and adult fish have been entrained at the canal since it was initially built in 1870. Construction of a canal intake screen will prevent entrainment of listed salmonids and will return them safely to the river below the dam. The canal fish screen will be constructed according to the NOAA Fisheries' design criteria. Therefore, the screens are not expected to entrain or impinge juvenile fish during operation. In addition, the fish bypass pipe will return fish that are diverted by the intake screens back to the river downstream of the dam.

As described in section 2.3.4.3, the City has developed a biological evaluation plan to monitor fish movement in the fishways and at the screen after construction (City of Albany 2004c). The fish monitoring activities will become part of the facilities operation and maintenance manual and will ensure that facilities are operated to safely and efficiently pass fish.

NOAA Fisheries expects that construction activities at the dam and the canal will result in significant, long-term improvements in upstream and downstream fish passage. These actions will restore properly functioning conditions in the action area for the habitat indicator, safe passage and access to habitat.

5.4.2 Habitat Element – Channel Morphology

As noted above in sections 4.2.5.1 and 4.2.5.3, channel dynamics and floodplain connectivity in the action area are primarily constrained by upstream dams and bank stabilization projects that inhibit natural channel-forming processes. Construction of the new left bank fishway, left bank access road, and rebuilt right bank fishway has the potential to affect channel morphology in the action area by altering stream hydraulics just above and below the dam.

Construction of the new left bank fishway, left bank access road, and rebuilt right bank fishway would result in the permanent loss of 0.20 acres of instream habitat (CH2M HILL 2004b). These structures would create a larger "footprint" within the stream and along the banks, which potentially could extend the constraining effect of the existing footprint of the dam. However, this relatively minor increment is unlikely to alter channel dynamics and morphology beyond the immediate areas upstream and downstream of the dam. Moreover, the City has proposed to replace this loss of instream habitat by reconfiguring steep banks below the right bank fishway with a more gradually sloped and revegetated bank.

NOAA Fisheries expects that this loss of existing habitat and replacement within the action area will have negligible effects on channel morphology and other habitat elements.

5.4.3 Summary of Long-Term Effects

As discussed in the preceding sections, potential long-term effects from the proposed action include direct fish mortality or injury at the new intake screen and fishways and modification of channel morphology associated with permanent loss of instream habitat and creation of the same amount of instream habitat below the right bank fishway. In each instance, however, the conservation measures the Corps would require the City to implement would result in negligible long-term adverse effects, and with respect to fish passage and access, strongly significant beneficial effects. These potential long-term effects are summarized in Table 5.1, which distinguishes immediate construction related effects from long-term effects of operation and maintenance of the new and rebuilt facilities.

Table 5- 1 Immediate and long-term effects of the proposed action, added to baseline conditions, considered in terms of their effects on reaching properly functioning conditions for each habitat indicator. (Effects: Impair = impairs properly functioning condition; Reduce = appreciably reduces already impaired habitat; Retard = retards long-term progress towards properly functioning condition, NR = does not reduce, retard, or impair properly functioning condition; Restore = changes the function of an AR or NPF indicator to PFC.)

Indicator	Baseline condition	Immediate and long-term effects of proposed action	Immediate effect of construction activities relative to PFC	Long-term effect of proposed action relative to PFC
Contaminants/ Nutrients	PFC	During construction, the risk of contaminants entering the river is low due to prevention provisions in the ESCP and PCP. In the unlikely event that contaminants do leak into the South Santiam River, they would be diluted quickly and would be expected to cause only short-term impairment of water quality conditions. No long-term effects.	Impair	NR
Temperature	NPF	The proposed action is not expected to cause immediate or long-term effects to water temperature in the action area.	NR	NR
Dissolved Oxygen	AR	The proposed action is not expected to cause immediate or long-term effects to DO in the action area.	NR	NR
Sediment/Turbidity	AR	During construction, in-water work necessary to install and remove the cofferdams and stormwater runoff from bank stabilization and revegetation may temporarily increase turbidity and suspended sediment within the action area. Provisions to reduce the likelihood of erosion and stormwater runoff into stream include working in dewatered areas behind cofferdams, using cofferdams that cause little sediment disruption, allowing in-water work during periods when fewest numbers of fish are present, requiring contractor to follow ESCP. No long-term effects.	Reduce	NR
Habitat Access/Passage	NPF	Passage through the construction area will be maintained through at least one route during construction. Fish may experience short-term delay as they transition between passage routes. After construction, long-term effects will be to restore fish passage and habitat access to PFC in the action area.	Reduce	Restore

Table 5-1, Continued

Indicator	Baseline condition	Immediate and long-term effects of proposed action	Immediate effect of construction activities relative to PFC	Long-term effect of proposed action relative to PFC
Substrate	AR	During construction, the likelihood of suspended materials entering the river is low due to prevention provisions in the ESCP. Any downstream accumulations of fine sediment are expected to have only short-term effects on bed material composition, as high winter flows would be expected to re-suspend fine sediments. No long-term effects.	Reduce	NR
Large Wood	NPF	The proposed action is not expected to affect large wood in the South Santiam River.	NR	NR
Off-Channel Habitat	NPF	The proposed action is not expected to affect off-channel habitat within the action area.	NR	NR
Pool Frequency/Quality	AR	The proposed action is not expected to affect pool frequency or quality within the action area.	NR	NR
Refugia	NPF	The proposed action is not expected to affect the availability of and access to refugia in the action area.	NR	NR
Channel Morphology	NPF	Construction activities are not expected to affect channel morphology. Long-term effects could potentially alter channel morphology, but this effect would be negligible because the limited instream habitat affected would be replaced with new instream habitat below the right bank fishway.	NR	NR
Streambank Condition	NPF	Construction of access roads, sedimentation ponds, and bank stabilization will require removal of existing riparian vegetation. This effect would be temporary, because the affected area will be stabilized immediately with hydroseeding, and revegetated with native shrubs, trees and grasses when construction is completed.	Retard	NR
Floodplain Connectivity	NPF	The proposed action is not expected to affect floodplain connectivity in the action area.	NR	NR
Flow Fluctuations	AR	The proposed action is not expected to affect flow fluctuations in the action area.	NR	NR

Table 5-1, Continued

Indicator	Baseline condition	Immediate and long-term effects of proposed action	Immediate effect of construction activities relative to PFC	Long-term effect of proposed action relative to PFC
Seasonal Low Flows	AR	The proposed action is not expected to affect seasonal low flows in the action area.	NR	NR
Seasonal High Flows	NPF	The proposed action is not expected to affect seasonal high flows in the action area.	NR	NR
Increase in Drainage Network	NPF	The proposed action is not expected to change the drainage network in the action area.	NR	NR
Road Density and Location	NPF	The proposed action is not expected to change road density and location within the action area.	NR	NR
Disturbance History/Riparian Reserves	NPF	Construction of access roads, sedimentation ponds, and bank stabilization will require removal of existing riparian vegetation. This effect would be temporary, because the affected area will be stabilized immediately with hydroseeding and revegetated with native shrubs, trees and grasses when construction is completed. No long-term effects.	Retard	NR

6. CUMULATIVE EFFECTS

Cumulative effects are defined in 50 CFR §402.02 as "those effects of future State, tribal, local or private actions, not involving Federal activities, that are reasonably certain to occur in the action area." Future Federal actions, including the ongoing operation of hatcheries, fisheries, dams, and land management activities, are not considered reasonably certain to occur because they require separate consultations under Section 7 of the ESA.

Any action that requires future Federal approval, funding, or other involvement is not included within the "cumulative effects" for this analysis (see ESA definition, above). Federal involvement of this type may trigger ESA Section 7(a)(2) consultation in the future. Once the consultation on those actions is completed, the effects may be considered part of the environmental baseline, consistent with the ESA regulatory definition of "effects of the action" (50 CFR §402.02). Examples of actions that require future Federal approval or funding include irrigation water withdrawals involving stored water from Corps' reservoirs (contracts required from U.S. Bureau of Reclamation) and agricultural practices that receive Federal funding through the U.S. Department of Agriculture.

There are numerous non-Federal activities that have occurred in the action area in the past, which have contributed to both the adverse and positive effects of the environmental baseline. The next step of the analysis for application of the ESA Section 7(a)(2) standards requires the consideration of non-Federal activities that are "reasonably certain to occur" in the future within the action area.

The Endangered Species Consultation Handbook (USFWS and NOAA Fisheries 1998) describes the "reasonably certain to occur" standard as follows:

> Indicators of actions "reasonably certain to occur" may include, but are not limited to: approval of the action by State, tribal or local agencies or governments (e.g., permits, grants); indications by State, tribal or local agencies or governments that granting authority for the action is imminent; project sponsors' assurance the action will proceed; obligation of venture capital; or initiation of contracts. The more State, tribal, or local administrative discretion remaining to be exercised before a proposed non-Federal action can proceed, the less there is a reasonable certainty the project will be authorized.

Future non-Federal actions that are most notable include Oregon Department of Environmental Quality TMDL (total maximum daily load) approval and implementation; Oregon Watershed Enhancement Board funding programs for watershed restoration projects; Oregon Department of Transportation and Linn County programs to build and modify roads and to improve fish passage through culverts and bridges; and Oregon State legislation to enhance salmon recovery through habitat restoration programs. All of these actions would be expected to help move "at risk" and "not properly functioning" habitat indicators in the direction of "properly functioning condition," rather than further impair, retard or reduce function.

There are likely numerous commercial and private activities, including recreation, urban and rural development, agriculture, and timber harvest, that could potentially affect listed species in the South Santiam River Basin, however, NOAA Fisheries has no information on which to conclude that such activities are reasonably likely to occur. Likewise, NOAA Fisheries knows of no ongoing or proposed tribal projects in the South Santiam River Basin.

In conclusion, NOAA Fisheries expects that future, non-Federal actions that adversely affect listed salmonids and their habitat, such as urban and rural development, will take place in the short-term at similar intensities as in recent years. Non-Federal actions such as State and county funded fish passage and habitat restoration projects will continue in the short-term and provide incremental improvements in habitat elements. During the term of this Opinion, however, NOAA Fisheries does not anticipate that the future non-Federal actions will significantly alter present habitat conditions in the action area.

7. CONCLUSIONS

This section presents NOAA Fisheries' biological opinion regarding whether the aggregate effects of the factors analyzed under the environmental baseline (section 4), effects of the proposed action (section 5), and the cumulative effects (section 6) in the action area, when viewed against the current rangewide status of the species (section 3), are likely to jeopardize the continued existence of UWR chinook salmon or UWR steelhead. To "jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (CFR §402.02). The conclusions are based on the proposed actions described in section 5 occurring as specified in the permit application, including in a timely manner.

After reviewing the current status of UWR chinook salmon and UWR steelhead, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, it is NOAA Fisheries' biological opinion that the proposed action is not likely to jeopardize the continued existence of these species. In making this determination, NOAA Fisheries has relied on the best available scientific and commercial data (section 12).

In reaching its conclusion, NOAA Fisheries finds that the construction process may cause some short-term impacts to UWR chinook salmon and UWR steelhead, primarily in the form of increased stress to individual fish isolated and salvaged behind the cofferdams, increased suspended sediment concentrations in the Lower South Santiam River, possible delays in fish passage when temporary fish passage routes shift, and temporary loss of riparian habitat cover. NOAA Fisheries determines that the short-term adverse effects are not likely to significantly reduce the functioning of already impaired habitat or retard the progress of impaired habitat towards PFCs within the time frame specified in this Opinion (until 12/2006). Moreover, the construction activities at the dam and the canal intake will substantially improve upstream and downstream passage for UWR chinook salmon and UWR steelhead in the South Santiam River.

The proposed action includes numerous measures which would reduce and avoid potential adverse impacts of construction activities on listed species, such as:

1. Completing in-water work during the ODFW-approved in-water work period developed specifically for these construction activities.
2. Isolating in-water work areas from the stream with cofferdams, thus minimizing opportunities for direct harm to fish from machinery.
3. Implementing and enforcing the City's ESCP (and erosion and sediment control practices described in the City's proposed conservation and mitigation measures) to minimize increases in suspended sediment, turbidity and chemical contaminants in the South Santiam River.
4. Installing a temporary upstream fish passageway during construction of the left bank fishway.

5. Replanting affected riparian habitat with native woody and herbaceous riparian vegetation, ensuring the restoration of proper riparian and floodplain processes.

Once construction activities are completed, fish passage in the action area will improve. Installation of a new left bank fishway and improvements to the right bank fishway under the proposed action will substantially improve upstream fish passage at the dam. Installation of fish screens that meet NOAA Fisheries' criteria will allow diverted downstream migrating fish to be returned to the river directly below the dam, avoiding entrainment in the irrigation canal and mortality and injury associated with turbine passage. Modifications to the dam will eliminate the need for the City to install flashboards, thereby reducing false attraction of upstream migrants to gaps at the dam's crest and eliminating the annual need to reduce river flows from Corps' storage reservoirs for flashboard installation.

8. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to Section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by regulation to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by regulation as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

An incidental take statement specifies the amount or extent of any incidental taking of endangered or threatened species. It also provides RPMs that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the RPMs.

The measures described below are non-discretionary, and must be undertaken by the Corps and the City and made binding conditions of any license or contract issued in the course of implementation of any component of the proposed action for the exemption in Section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps: 1) fails to assume and implement the terms and conditions; or 2) fails to require the City to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the contracts, the protective coverage of Section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the action and its impact on the listed species to NOAA Fisheries as specified in the incidental take statement (50 CFR §402.14(i)(3)).

Because the incidental take which may be permitted by this Opinion is limited to take that results from the proposed action, this Statement does not apply to any take resulting from future operation of the facilities to be constructed pursuant to the proposed action. As discussed above, operation of the dam and canal for hydropower purposes is licensed by FERC, and any effects to listed species which flow from hydropower operations must be the subject of consultation between NOAA Fisheries and FERC before the requirements of the ESA may be satisfied.

8.1 Amount or Extent of Take

NOAA Fisheries anticipates that the proposed action is reasonably certain to result in incidental take of UWR chinook salmon and UWR steelhead because of the detrimental effects from the capture and release of fish necessary to isolate the in-water work area (non-lethal and lethal), increased sediment and possible pollutant levels (non-lethal), and riparian habitat disruption (non-lethal).

Effects of actions such as minor sedimentation and minor riparian disturbance are unquantifiable in the short-term and are not expected to be measurable as long-term harm to habitat features or as long-term harm to salmonid behavior or population levels. Therefore, even though NOAA Fisheries expects some low level of incidental take to occur due to the construction actions, the best available scientific and commercial data are not sufficient to enable NOAA Fisheries to estimate the specific amount of incidental take to the species itself. In instances such as these, NOAA Fisheries designates the expected level of take as "unquantifiable."

8.2 Reasonable and Prudent Measures

NOAA Fisheries believes that the following RPMs are necessary and appropriate to minimize the effect of anticipated incidental take of UWR chinook salmon and UWR steelhead from the actions covered in this Opinion. The Corps must include permit provisions to require the City to:

1. Minimize the likelihood of incidental take from in-river work by operating within the ODFW approved in-water work periods developed specifically for these construction activities and ensuring safe passage conditions during construction.

2. Minimize the likelihood of take from fish salvage during dewatering by following NOAA Fisheries guidelines to avoid or minimize fish injury and mortality.

3. Minimize the likelihood of incidental take and alteration of critical habitat by ensuring that construction practices are designed to limit the affected area to the minimum necessary to complete construction activites, by implementing responsible construction techniques, and by fully revegetating with native species.

4. Minimize the likelihood of incidental take from sedimentation and chemical contamination by ensuring that effective erosion and pollution control measures are developed and implemented.

5. Monitor the effectiveness of the proposed conservation measures in minimizing the effect of incidental take, and report monitoring results to NOAA Fisheries.

8.3 Terms and Conditions

In order to be exempt from the provisions of section 9 of the ESA and regulations issued under section 4(d) of the ESA, the Corps must include permit requirements that require the City to comply with the following terms and conditions, which implement the RPMs described above for each category of construction activity.

1. *To implement RPM #1 (in-river work), the Corps must ensure that the City comply with the following:*
    a. Follow in-water work timing as described in section 2.3.1.1.
    b. Ensure fish passage during all phases of construction, as described in section 2.3.1.3.

2. *To implement RPM #2 (fish rescue and salvage), the Corps must ensure that the City comply with the following:*
    a. Follow fish capture and release protocols described in section 2.3.1.10.

3. *To implement RPM #3 (responsible construction techniques), the Corps must ensure that the City comply with the following:*
    a. Mark the boundaries of clearing limits to prevent ground disturbance of riparian habitat beyond that in the construction area, as described in section 2.3.1.5.
    b. Follow temporary road construction requirements described in section 2.3.1.6, to limit land disturbance for access roads and to ensure site restoration after temporary access roads are obliterated.
    c. Prepare site by conserving native materials for restoration, where possible, and by replacing damaged materials with functional equivalent, as described in section 2.3.1.8.
    d. Restore site using native vegetation and restoration techniques, as described in section 2.3.1.12.

4. *To implement RPM #4 (pollution and erosion control), the Corps must ensure that the City comply with the following:*
    a. Follow requirements identified in section 2.3.1.4, to ensure that the contractor prepares and follows an ESCP in accordance with the Draft ESCP (City of Albany 2004b).
    b. Ensure that the ESCP include a pollution control plan to prevent point source pollution related to contractor operations.
    c. Follow requirements described in section 2.3.1.5, to ensure that materials are onsite for containment of hazardous materials in the event of accidental spill.
    d. Fuel, operate, maintain and store heavy equipment as described in section 2.3.1.7, to minimize the risk of hazardous materials leaking or spilling into waterways.
    e. Isolate the work area, as described in section 2.3.1.9, to ensure construction work takes place in dewatered area.
    f. Follow requirements described in section 2.3.2, which identifies activities to protect streambanks from erosion and to maintain streambank and channel function.

g. Follow requirements described in section 2.3.4.1, Stormwater Control, to avoid pollution caused by runoff from the construction site.
h. Ensure that hazardous materials are handled as described in section 2.3.4.2.

5. To implement RPM #5 (monitoring), the Corps must ensure that the City comply with the following:

a. Submit an implementation monitoring report to NOAA Fisheries within 120 days of construction completion, identical to that described in section 2.3.3, to confirm that the objective of minimizing take from permitted activities is met.
b. Submit an annual monitoring report to NOAA Fisheries, as described in section 2.3.3.4, by December 31 of each year, beginning the first year of construction, and continuing for a period of five-years following construction.
c. Ensure that the biological evaluation plan and facilities operation and maintenance manual are completed and implemented as described in section 2.3.4.3. Report results of post-construction biological and facilities' evaluations to NOAA Fisheries.

9. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse modification of critical habitat, or to develop additional information. NOAA Fisheries has no conservation recommendations to make at this time.

10. REINITIATION OF CONSULTATION

This concludes formal consultation on the Corps action described in the BA (CH2M HILL 2004a) for construction activities at the City's dam and canal intake. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take specified in the incidental take statement is exceeded, or is expected to be exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion; or, 4) a new species is listed or critical habitat designated that may be affected by the action (50 CFR §402.16). In instances where the amount or extent of incidental take specified in the Incidental Take Statement is exceeded, the Corps must notify NOAA Fisheries and reinitiate consultation immediately [(50 CFR §402.14(i)(4)].

11. ESSENTIAL FISH HABITAT

11.1 Background

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a Federal fisheries management plan. Following the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§305(b)(2));
- NOAA Fisheries must provide conservation recommendations for any Federal or State action that would adversely affect EFH (§305(b)(4)(A));
- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NOAA Fisheries EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (§305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR §600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR §600.810).

EFH consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

11.2 Identification of EFH

Under the MSA, the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Federally managed Pacific salmon: chinook (*Oncorhynchus tshawytscha*); coho (*O. kisutch*); and Puget Sound pink salmon (*O. gorbuscha*)(PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically, accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man made barriers (as identified by the PFMC 1999), and longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based, in part, on this information.

11.3 Proposed Action

The proposed action is detailed above in section 3 of this Opinion. The action area is described in section 4 and includes habitats that have been designated as EFH for various life history stages of chinook salmon.

11.4 Effects of the Proposed Action

As described in detail in section 5 of this Opinion, the proposed action may result in short-term adverse effects to a variety of habitat parameters. The proposed action may result in a short-term disturbance of stream bed material, a short-term increase in turbidity and sediment levels, and a temporary reduction in riparian vegetation. Chemical contaminants could enter the river due to the close proximity of the construction staging area to the river, but this risk is low due to implementation of conservation measures described in the action agency's proposed action and the terms and conditions of this Opinion.

11.5 Conclusion

NOAA Fisheries concludes that the proposed action may adversely affect designated EFH for chinook salmon.

11.6 EFH Conservation Recommendations

Under section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions which may adversely affect EFH. The conservation measures that the Corps included in the proposed action and all of the Terms and Conditions contained in section 8.3 of this Opinion apply to salmon EFH. Consequently, NOAA Fisheries adopts all the terms and conditions in its incidental take statement (section 8 of this Opinion) as its EFH recommendations.

11.7 Statutory Response Requirement

Under the MSA (§305(b)(4)(B)) and 50 CFR §600.920(j), Federal agencies are required to provide a detailed written response to NOAA Fisheries' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

11.8 Supplemental Consultation

The Corps must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR §600.920(k)).

12. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) (Data Quality Act) (DQA) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the Opinion addresses these DQA components, documents compliance with the DQA, and certifies that this Opinion has undergone pre-dissemination review.

Utility: This document records the results of an interagency consultation. The information presented in this document is useful to two agencies of the Federal government (NOAA Fisheries and Corps), the City of Albany, the residents of Linn County, OR, and the general public. These consultations help to fulfill multiple legal obligations of the named agencies. The information is also useful and of interest to the general public as it describes the manner in which public trust resources are being managed and conserved. The information is beneficial to citizens of Linn County because the underlying project affects natural resources at a site within that county. The information presented in these documents and used in the underlying consultations represents the best available scientific and commercial information and has been improved through interaction with the consulting agency.

Individual copies were provided to the above listed entities. This consultation will be posted on the NOAA Fisheries NW Region web site (http://www.nwr.noaa.gov). The format and naming adheres to conventional standards for style.

Integrity: This consultation was completed on a computer system managed by NOAA Fisheries in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

Objectivity:

Information Product Category: Natural Resource Plan.

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NOAA Fisheries ESA Consultation Handbook, ESA Regulations, 50 C.F.R. 402.01 et seq., and the MSA implementing regulations regarding EFH, 50 C.F.R. 600.920(j).

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the literature cited section. The analyses in this Opinion/EFH consultation contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NOAA Fisheries staff with training in ESA and MSA implementation, and reviewed in accordance with Northwest Region ESA quality control and assurance processes.

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